University of Alberta

CTS and WWW: Facilitating Student Choice

by

Margaret Stambuski-Dart ©

A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the
degree of Master of Education

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Margaret Stambuski-Dart

Box 204
Linden, AB
T0M 1J0

October 1, 1997

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *CTS and the WWW: Facilitating Student Choice* by Margaret Stambuski-Dart in partial fulfillment of the requirements for the degree of Master of Education.

Maryanne Doherty-Poirier
Dr. Maryanne Doherty-Poirier (supervisor)

J Parsons
Dr. Jim Parsons

Ken Ward
Dr. Ken Ward

September 30, 1997

ABSTRACT

This study examined the use of Internet technology in facilitating junior high school student choice in Career and Technology Studies (CTS) in a small, rural school in Carbon, Alberta. Three key components were explored. The first one was electronic delivery using the Internet and the World Wide Web (WWW) as a means of delivering interactive foods modules to students where facilities nor teacher expertise exists. The second component involved determining models of alternative assessment that could be used; and the last component explored the support network provided through electronic delivery. The study is guided by action research integrated with a personal journey narrative. Chapters 1 and 2 discuss the framework of technology, assessment, and constructionism while the research question is being formulated. Chapter 3 explores the construction of the website for FOD101 - Basic Foods. Chapter 4 explores the components of the research question in terms of data collection and findings. Chapters 5 and 6 discuss the criteria for success plus future implications. In conclusion, these criteria include: adequate technical support, technological compatibility , strong willed research team, and the use of alternative student assessment strategies.

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INTRODUCTION

A PERSONAL JOURNEY BEGINS

Black/white
Near/far
Academic/vocational
Home economics/technology

Logocentrism, the statement of perceived opposites, is at the very center of our every day language (Jarrett, 1997). As educators, we expose our students to the world of opposites in our voices, our actions, and our teaching. Students today are experiencing confusion as they try to assimilate a global view of education while being bombarded with diametrical words and actions.

I have become personally and professionally interested in the logocentrism implied by the home economics/technology coupling. "*Home economics is just cooking and sewing; a computer doesn't belong in the home economics lab.*" As a home economics/Career and Technology Studies (CTS) educator avidly immersed in the field of technology, it seems inappropriate to separate the terms. As technology begins to infiltrate our daily existence, from bank cards to transportation, its assimilation in the education field, especially in regard to home economics/CTS, becomes preeminent. A recent position paper published by the Canadian Home Economics Association (1996) recommends to educational policy makers that home economics as a school subject assists students in addressing the social, economic, and technological trends that face individuals and families everyday. Hence, if students are going to face technological trends in the world outside the classroom, they should be learning with technology in the classroom.

As a home economics/CTS educator I feel that it is important for my students to learn to be reflective, to develop decision making skills, to enhance communication skills, and to incorporate strategies for responsible living. All of these daily living skills are important and they can be taught with technology (Stambuski-Dart, 1997). Students can come to realize that technology is an essential part of their lives and that the classroom is the appropriate setting for learning the knowledge that can prepare these skills. This view has to become commonplace in home economics/CTS and other subject areas so that students are adequately prepared for the next millennium.

As I begin my personal journey, described in italics, into the mystic coalescence of home economics and technology I am propelled by my personal desire to merge two fields of study that are often taught in isolation of each other. Why do I use the term "mystic?" I consider the coupling of home economics and technology illusionary because, although they seem like they should be treated as one, they are often treated as separate entities. While many educators continue to separate the terms I have been encouraging students to use technology to complete projects, calculate answers, and accentuate cross curricular learning for eight years. These years have often been tumultuous as I have tried new ideas for integrating technology. I have often felt isolated, but these events have built a certain "stick-to-it-ness" that has prevailed to allow me to examine each frustration as a learning experience. By sharing these experiences through presentations and papers I continue to encourage other educators to try the "technology thing." But what do I mean when I use the term technology? For me, and for the purpose of this paper, technology refers to the use of computer hardware and software in the classroom. My personal technology journey began eight years ago and continues today. At times the journey has been difficult yet, it has also been challenging and rewarding as I continue to learn about new ways to use technology in the classroom. Two new strategies I am going to consider in this study are the Internet and the World Wide Web (WWW) and their use as a delivery strategy. Hopefully my journey exploring the coupling of home economics and technology will become easier now that Career and Technology Studies (CTS) has embodied the field of home economics and apportioned its contents into the food, fashion, and community health programs.

For continuity purposes, terminology used in this paper will be defined in the footnote immediately following its initial usage.

CHAPTER ONE

DETERMINING THE PORT O'CALL: DEVELOPING THE FRAMEWORK

Technology

Technology as a Social Force

Change. Change can invite cynicism. Change can invite warm reception. Change can be embraced by many or disregarded by the masses. We have seen many changes in the past millennium, yet, the rate of change has exploded exponentially in the last two decades. Grandparents today remember the first telephone. Parents today remember the first television. Young adults today remember the first computer. Students today remember their first personal computer. Many people have been subject to multitudinous changes. Today's youth have grown up in a media-driven world that they now take for granted. Calculators, video cassette recorders, home computers, laptop computers, and compact disc players are examples of how their world has become rich in multi-dimensional, multi-sensory imagery augmented by technology (Miller, 1994; Ritchie & Hoffman, 1996). Students today thrive by working, playing, and learning with technology. They need to be computer literate to complete class assignments, to secure jobs in the work world and to function in this interactive global environment. As educators, we need to provide opportunities for students to learn skills that will benefit them at school and at work.

Technology has, in the past, been the indicative change of the decade. Today the word technology is synonymous with computers; yet, in the past there have been other technological breakthroughs. Televisions were technology in the 1960's, calculators were technology in the 1970's, VCR's were technology in the 1980's, and now computerization (not necessarily computers) is the technology of the 1990's. Each of these changes has experienced a four-stage cycle on its way to adoption. Cuban (cited in Swift, 1995) explained that the four stages included the expectation stage when the technology was endorsed; the rhetoric stage when the technology was heralded and hyped; the policies stage when the technology was regulated; and the limited-use stage when the technology was adopted by some and disregarded by others. The four-stage process appears to be occurring at an increased pace in the 1990's yet, our youth seem caught between a cycling stage one-stage four phenomenon. As the latest technological breakthrough becomes the newest industry standard, it is quickly replaced with bigger and better before it can be thoroughly learned.

Now its the new MMX technology, yesterday it was only the 486. I haven't had a chance to place my hands-on a Pentium and now it is obsolete technology. The new computer lab, with its new Pentium computers, is already in need of upgrading and it is only six months old. The newer the technology, the more classes that want to use it! This year there are more classes that have to take keyboarding and fewer blocks for actual curriculum integration. We continuously herald the newest technology but are we effectively using the technology we have? It seems as if the "expectation stage" reappears with each new technological release but by the time we've advanced through the "rhetoric" and the "policies" the technology is dated or the enthusiasm has been subdued resulting in "limited use." We need to address the way we introduce technology into the schools to make its inception more timely and its use more prevalent.

Technologies are changing so fast that there isn't time for policy development before a newer technology is unleashed. How does everyone stay abreast of the latest technologies yet, comfortable in their everyday handling of it? How do school budgets handle the increasing cost of up-to-date technology? Yes, some researchers would support the notion that our schools have been slow to evoke change since true educational change involves more than the addition of the latest technological tool (Carpenter, Frank & Shoup, 1995; Reibel & Wood, 1994; Spiro, Feltovich, Jacobsen & Coulson, 1991).

The adoption and total integration of technology has been haphazard due to the lack of two of the four requirements necessary for the adoption of a major educational change (Ritchie & Wiburg, 1994; Swift, 1995). There is a **driving force** (our students) coupled with the **social vision** (our future), but the **proof of concept** (does it work?) has been mediocre at best and a tangible **institutional leverage** (internal support) has not been supplied to encourage a complete transformation in the way things have been done. Lai (1993) and Reibel and Wood (1994) further explicate the latter requirement by elaborating that the successful integration of technology involves the support of administration, a pedagogical change for educators, adequate professional development, and a collaborative environment. In many classrooms, technology is merely viewed as an add-on, a tool to augment traditional ways of doing things (Koneman & Jonassen, 1994; Marcinkiewicz, 1994). The mere existence of a technology does not guarantee its implementation or integration. Technology can play two roles in our classrooms: as a tool to access information and generate products, or as an intellectual partner to represent, reflect and support mindful thinking (Buffmanti & Paulter, 1994). If we support the latter role we are embracing the concept of the computer as a "mindtool" (Jonassen, 1996) and this requires a change in pedagogical thinking in order to develop a working and beneficial relationship between educator, student, and technology (Spiro et al., 1991; Swift, 1995).

*Home economics/CTS is a logical subject for technology integration. Students develop critical thinking skills, enhance decision making skills, elaborate problem-solving skills and expand social and global expectations. If they could do all of this with technology **and through** technology then they would be prepared for an active and responsible role in society.*

Pedagogically Embracing Technology

> The 7th Plan, when instituted, will see a savings of 42% in teachers' salaries for the fiscal school year (Nielsen, Chinook's Edge Regional Division, 1996).

If the adoption of technology is going to mean the loss of educators' jobs it is not surprising that educators aren't embracing its integration with open arms and unquestioning minds. Educators are scared, hence, the pedagogical change needed to completely implement technology is not evident in the majority of the classrooms (Reibel & Wood, 1994). Educators' enthusiasm for new technology may exist but their actions tell another story (Koneman & Jonassen, 1994). Technology as a force needs to be reckoned with because its use is becoming necessary for economic survival in today's work world (CHEA, 1997). Furthermore, educators need to be reassured that technology will not replace them even as their role in the classroom changes. Educators may have to step away from the front of the classroom and adopt the role of facilitator/guide, provider of resources and feedback, and poser of questions (Bailey, 1996). Technology will impact how students learn and it will act as an aid to supplement educators' lessons but educators should view technology as another tool, similar to the chalkboard, to maximize their instructional repertoire (Davis & Henry, 1993; Prawd, 1996).

A recent survey carried out by Hill, Wicklein and Daugherty (1996) clearly indicates that it is necessary to have technology available for students and that instruction in and with technology aids in developing life-long learning goals. But educators must step out of their present frames of mind and adopt a more learner-centered approach to discovery learning (George & Sleeth, 1996; Reibel & Wood, 1994). Relationships between educators and students should symbolize a new way of thinking about technology (Friedman, 1994). New pedagogical attitudes that work with technology need to be developed (Friedman, 1994). Educators must teach students how to work with a variety of media to maximize their learning potential and develop a global outlook (Mueller, 1994; Reibel & Wood, 1994). Skill acquisition and experiential learning must become paramount and meaningful to students (Anderson & Joerg, 1996; Hoskisson, Stammen & Nelson, 1996). Learning *with* technology not because *of* technology must be the new focal perspective (Clark, 1994).

Technology, as a vehicle for learning and a tool for teaching, is paramount (Volker in Bailey, 1996). The computer will not be the panacea for all that ails society but it will empower learners and help them assume responsibility for their learning (Trentin, 1996). Before this situation becomes a reality educators in the classroom need to exchange their win-lose attitude, where they use technology to do the same things only faster (Hoskisson et al., 1996), for a new win-win pedagogically superior attitude, where student, educator, and technology work together. The educator who is preparing to instruct future students needs to be creatively progressive and progressively creative (Berryman, 1995; Lai, 1993; US Dept. of Education, 1996).

Technology As A Method Not A Subject

Educators, who consider themselves progressively creative, have acquired a personal knowledge of, and made a committment to integrating technology. It is not the computer that teaches the student to think creatively but rather the way the educator instills in the student an innate desire to learn through inquiry. As soon as the word "technology" became commonplace in our vocabulary it simultaneously became associated with subjects such as industrial education and/or computer studies. Technology education or educating with technology is more than that:

> ... it is about preparing our youth for their future in a technologically advanced world. Its unique mission is to provide relevant and meaningful learning experiences that reinforce academic content and enhance higher-order thinking skills (Johnson cited in Hill et al., 1996, p.6).

Although technology has been introduced into our school systems it has not been the panacea to what may ail the system. In these cases technology has been deemed the solution to whatever problems it was instilled to correct. There is another way to view technology in education -- as the problem. When technology is viewed as the problem and not the solution it has the opportunity to establish in students the value of problem-solving, creativity, ingenuity, innovation, and collaboration (Mauldin, 1995). The combination of a variety of media -- lectures, textbooks, film, video, and software -- allows the educator the opportunity to experiment and discover what works for students (Hannafin, 1992). No one medium will ever be totally effective in and of itself but when it is combined with others the opportunity to effectively improve and change the educator-learner relationship greatly increases. The medium and the method need to be viewed as an integral entity (Clark, 1994; Miller, 1994; Shin, Schaller & Savenge, 1994). For example, the "technological perspective" many school divisions are adopting as they complete their technology plans is more than: a means-end testing schemata; teaching a subject entitled "technology"; achievement testing; a final, do-able project or test; more than answering the requests of the business community; and it is definitely more than determining the optimum number of computers in a school (Donlevy & Donlevy, 1996).

> A new [perspective] is needed; a [perspective] that changes the focus from teaching to learning, a [perspective] that integrates technology as a means of both freeing and empowering students and teachers, a [perspective] in which thinking skills are used to create individual, personal knowledge that can be shared instantaneously with anyone in the world who is connected and who has an interest (Kizlak, 1996, p.121).

As educators of future citizens we need to be instilling in our students a desire for life-long learning (Ray, 1991). We learn every day of our lives; we never stop learning. As educators we need to stop treating 'technology' as a means to an end. Technology is:

> knowledge construction not reproduction,
> conversation not reception,
> articulation not repetition,
> collaboration not competition,
> reflection not prescription (Spiro et al., 1991).

As noted previously in this paragraph, it is important to focus our attention on learning and the changing ways in which we learn.

I've seen so many educators excited about using technology in their classrooms but they want to continue an educator-directed approach. That's great, but, if there is only one computer in the classroom how is that possible? The modularized CTS program is ideally suited to maximize individual choice for students and if a CTS educator chose to adopt the total student-directed learning approach to instruction then, yes, it might be possible. The one computer classroom may be a reality for many years and the issue of integrating technology in a way that will encourage educators to adopt its use, increase choice for the individual students, offer opportunities to learn about new technologies while completing curriculum work, and be new and exciting for the students.

Diversity in Learning Theories

> Learn (lûrn). 1. To acquire knowledge, understanding, or mastery (of) by study or experience. 2. To memorize. 3. To become informed of: discover (Webster, 1984, p.399).

If the definition we ascribe to for learning assists us in forming our ideas on learning theories then there is a wide range of possibilities and combinations. The environment that is conducive to knowledge acquisition is dependent upon the learning theory assumed by educators. What kind of physical environment helps students learn best? Are neat rows of desks better situated to mastery learning or memorization while discovery learning is enhanced with learning centres? Often we, as educators, forget that learning is entwined within the culture of the classroom, the culture of the school, and the culture of each student's family. To learn is not a static event; to learn is to constantly change as new information is perceived and received (Maddux, 1996). But do educators treat learning as a fixed event -- a process all students need to go through as they indelibly sit in their desks? Or do educators treat learning as an active event -- a process which is ongoing, influenced by prior knowledge and the learner's goals (Maddux, 1996)? Each of these scenarios is located at opposite ends of the continuum anchored between the theories of objectivism and constructivism.

Tabula Rasa

One theory about teaching and learning predominant in classrooms throughout Alberta is "tabula rasa" which loosely translated means "clean slate." Are all students sitting diligently in front of us on their first day of school clean slates? Another term I have frequently heard in education courses is "empty vessel" (Teslow, Carlson & Miller, 1994). Are students empty vessels -- waiting to be filled with the wisdom and knowledge educators pour into them? One can picture the empty vessel classroom -- rows of students, neatly arranged desks, educator in front of the classroom, books open, pencils writing furiously as the educator discusses, writes or lectures about an important concept that will be on the final exam. This scenario is played out in many schools everyday. In post-secondary education courses (in the past) we were taught to dispense information, to value student input through raised hands and attentive questions, to construct tests, to examine subject content through memorization of facts, and to grade learning as knowledge acquired through memory. This scenario is indicative of the empty vessel classroom. Student discovery, student inquiry, student-centered learning, and critical thinking skills are not encouraged nor enhanced through this theory of learning or teaching.

Tradition and home economics are often used simultaneously. "How can we be sure they are getting the essential basics if they don't write notes" is frequently heard from the ranks. Are these the same classrooms that are hesitant about integrating technology? At a recent presentation on "Technology Tips & Tricks" I was telling participants how to integrate desktop publishing into their curriculum by having students prepare menus on the computer. An educator in the audience retorted "Aren't we defeating the purpose by not making them do it manually first?" Everybody's idea of the role of the technology in the classroom is confirmed by their own technological understanding and personal attitudes. Maybe my journey will take a little longer than expected.

We consistently make many assumptions about learning based on the prevalent theories: students transfer learning from one situation to another; learners are passive receivers of wisdom; learning is the building of bridges between stimuli and correct responses; learners are blank slates on which knowledge is inscribed (Strommen & Lincoln, 1995). These assumptions form the basis for instructionism or objectivism, which is at one end of the learning theories continuum (Jonassen in Feng, 1996). An educator utilizing the objectivism theory decides what a student should know, constructs a task analysis of that knowledge, analyzes the learner's existing capabilities, designs a strategy to communicate the required information to the learner, then tests to see if the communication process has been successful (Tomlinson & Henderson, 1995, p14).

How does a computer fit into the classroom taught by an objectivistic educator? Many classrooms have one computer in their midst -- a computer loaded with drill and practise test banks or a computer complete with arcade type games to test acquired knowledge. The first computer I had in my classroom had that purpose. I didn't know how to effectively use it as a teaching tool, it was more of a reward tool for those students who were done their work early. Perhaps that was indicative of the methodology courses I took in university. Objectivism is easy to adopt, it is easy to teach, it is easy to control, and it is easier to apply disciplinary measures. Maybe that is why it is hard for many home economics educators to change midstream and adopt a new way to teach ....

Objectivism centres around the educator who analyzes, designs and tests the knowledge acquisition of the student. The amount of learning that occurs in the classroom is directly proportional to the test scores. There is no mention of context, real-life learning, authentic assessment, or developing critical thinking skills. These terms are equated with the other end of the continuum -- the constructivism theory.

Past + Present = Future

The constructivist theory, originally developed by Piaget, used by Vygotsky, and later adapted to education, in 1960, by Jerome Bruner focuses on active learners -- learners who are partners in learning, who build upon previous knowledge to make sense of present knowledge, who are at the center of classroom activities, and who discover and learn the individual meaning behind each event or activity (Gulack, 1994; Maddux, 1996; Poncelet & Proctor 1993). The premise behind the theory of constructivism is that learning is unique for students as they construct meaning by combining their past knowledge with their present knowledge. Learning does not occur by direct instruction but rather by students assembling meaning from pieces of reality (D'Ignazio in Bailey, 1996). Therefore the learning which occurs in a constructivist classroom cannot be tested with a common test because it is different for each and every student. Students bring their own background and assimilate their own knowledge about a variety of events based on these past experiences. The activities that occur in a constructivist classroom are learner-

or child-centered focusing on activity-based learning where students learn collaboratively (Bailey, 1996; Hooper, 1992; Jonassen, Davidson, Collins, Campbell & Bannan Haag, 1995). The educator in a constructivist classroom is not the center of attention.

In a constructivist classroom the educator becomes the guide, the facilitator, the consultant, and the provider of learning experiences (Reibel & Wood, 1994). The activities focus on collaborative projects where students work towards a common end or goal. Concepts are not taught as isolated issues but rather in an intricate context interwoven amongst the ideals of the larger project. Students seek answers to their questions in the context of their larger project and ultimately assume a larger responsibility for their own learning (Jonassen et al. 1995; Reibel & Wood, 1994; Reiser, 1994; Toomey & Ketterer, 1995). Many educators may visualize the constructivist's classroom as rooted in chaos where students are involved in their own activities, acquiring relevant knowledge based on the level of previous knowledge with the educator catapulting back and forth tirelessly constructing individualized learning activities for each and every student. This may be a visualization but that is not the case. One automatically assumes that once the control is removed from the front of the classroom by having the educator act as a facilitator then chaos is imminent. Students, whether they are working in groups or individually, tend to regulate their actions and when presented with a complex problem lean towards structure and self discipline to accomplish their goals.

As there are limitations with the empty vessel approach to teaching so too are there problems with the constructivist's theory. The most common limitation is the time demand on the educator who is responsible for designing a variety of different activities for a variety of students or encouraging students to apply personal meanings to the questions or problems they are exploring. Is this because, as educators, we don't want to release total control of our classroom? The learning centre approach and/or the student-directed approach are two approaches that superficially address the constructivist needs of the student in balance with the objectivist needs of the educator.

Unfortunately both approaches involve extra educator time to set up and monitor as administrators and supervisors still look for objectivist's outcomes in evaluation. As educators who are subjected to provincial testing it is hard not to "teach to the test" to ensure students exhibit the correct responses to the correct question in the correct context so that teachers themselves are evaluated in the correct light. If we adopt a student-centered approach to learning, students may gloss over important ideas or they may not be aware of the concept inherent in the activity (Relan & Smith, 1995).

Should learning be fun? Do educators want to encourage collaboration and socialization? Do educators want to encourage realism in learning and easier, more personable transferability (Relan & Smith, 1995)? Is it enough to regurgitate the facts at test time or do educators want to encourage higher-order thinking and questioning skills (Toomey & Ketterer, 1995)? The constructivist theory may provide valuable learning experiences in personal context to individual students but will essential baseline learning concepts such as "i before e except after c" disappear?

The student-centered approach to home economics was highly touted as the "in" way to teach the subject matter freeing up educator time to assist students who needed extra help. After trying the student-centered approach I have seen many educators return to the comfortable objectivist's model because they felt students were glossing over essential information. The newly implemented and modularized CTS program has the potential to provide a perfect balance along the learning theory continuum. I think of the modules I have written that are exacting and precise for students who need to learn essential facts while other modules are open to interpretation for students who need to apply their learning. Perhaps this is how technology and home economics can survive successfully together – objectivism to teach the concepts, constructivism to explore expression through the use of technology....

Meaning Making

Proponents of the constructivist theory with a twist include Papert in 1990, Spiro in 1991 and Jonassen in 1995. Each of these researchers has chosen to adopt fragments of the existing theory on constructivism on their journey to create another theory of learning.

In the earlier literature of Strommen and Lincoln (1995), Papert had been associated with constructivism, but, since 1992, he has been associated with a new term –

"constructionism." Although this term is similar to constructivism there are some drastic differences:

> The word with the v expresses the theory that knowledge is built by the learner, not supplied by the teacher. The word with the n expresses the further idea that this happens especially felicitiously when the learner is engaged in the construction of something external or at least shareable (Papert in Hooper, 1992).

The emphasis in constructionism is the actual building or constructing of some concrete item which can be handled or a theory which can be shared with others. This seems rather vague as in the literature the "something" could be a term paper, project, report, problem, plan, or hypothesis (Hooper, 1992; Merrill, 1991; Toomey & Ketterer, 1995). Whatever the choice of display, the important criteria differentiating constructionism is that the learning event must be personally meaningful to the student (Bennett, 1996; LeBaron & Bragg, 1994; Ritchie & Wiburg, 1994). The theory of relativity may be abstract to one student but another student could envelop the theory and continue to delve into the problem situation by constructing personal meaning.

Maybe this is it! All students do not have to use technology in home economics to construct their projects or apply their learning but the technology needs to be available for those who wish. If we make the technology available then students whose "personal meaning" involves technology could in fact use the hardware as a tool to express their learning. The key to technology in the home economics classroom is the word "tool"....

Constructionism, as a learning theory, is relatively new and, hence, continues to be analyzed and formed over the years. For example, since the release of his initial definition and explanation, Papert has adamantly declared that constructionism involves the fabrication of something concrete (Clark, 1994; Jonassen, 1995). Papert continues to believe that the educator has an important role to play in the classroom as a planner, a manager, an encourager, a facilitator, a guide, and as an important influence. The educator has the capability to guide the learning process by asking the right question at the right time to encourage the students to cognitively think about why they are doing the things they are -- the educator provides empowering opportunities for the learner

(Gokhale, 1995; Swift, 1995). This concept of learning is reflected in the old African proverb: "If a man in hungry you can give him a fish, but it is better to give him a line and teach him to catch fish himself" (Davidson, 1995). But is it enough to empower learners and have them construct projects to indicate their levels of learning?

Embedded in the discussion of constructivism and constructionism is the idea of creating meaningful learning situations or embedding learning in real or situated environments (Merrill, 1991). Each of these theories insist that all learning must occur in a "real" (as opposed to abstract) context for students to process the information to construct personal meaning (Jonassen et al. 1995). In other words, cooking must be done in a kitchen, carpentry is best learned in a woodworking shop, and electronic communication is best learned at Telus™. Only if the learning can occur in the authentic context can students absorb the conceptual importance of the event (Bixler & Askov, 1994; Clark, 1994; Strom, 1996; Swift, 1995). But can all learning take place in an authentic or real situation?

The development of instructional transaction theory (ID2) at the Utah State University involves the merging of constructivism with the instructionist or objectivist theory. Similar to the constructivist theory, ID2 does not condone the tabula rasa or clean slate ideal; it acknowledges that mental models are constructed and are based on a variety of past experiences. The ID2 theory envelops the idea of situated learning but it also recognizes the fact that all learning cannot occur in authentic atmospheres due to logistics and safety. ID2 recognizes the fact that a common knowledge base or foundation needs to be built which can transect all subject matter areas; hence, there is a common element to all learning. This learning can take place in an abstract environment to allow for maximum transferability for all students.

Whereas constructivism insists on no external control of learning from the educator, ID2 acknowledges that there is some instruction which is common to all subjects and helps form the basis for all learning. ID2 confirms the need for some concrete objectives; therefore, some common strategies for learning are required, whereas constructivists insist that there are no common objectives nor strategies for learning. ID2 and constructivists believe in the active learner with testing integrated throughout the learning activities. Collaboration is the central theme behind constructivism, yet, it is only a component of ID2 which combines individualized activity with a complement of collaboration nurtured and supported by instruction (Tomlinson & Henderson, 1995). Last, ID2 recognizes the fact that all learning is constructed by individual learners but it also states that as Homo Sapiens we have common experiences which in turn determine the direction of our learning (Perkins, 1991).

Instructionism -- constructivism -- constructionism -- instructional transactional -- which theory are you most comfortable with as an educator? Does an educator prescribe to true instructionism or objectivism and ignore the need for hands-on practical activities (Bennett, 1996)? Does an educator prescribe to constructivism and ignore the need for fundamental concepts? Does an educator prescribe to constructionism and view evidence of learning in concrete projects and proposals? Does an educator subscribe to ID2 which purports that all students need a common base through common instruction after which learning can be individualized, collaborative and active? Regardless of the dominant theory in any educator's repertoire it is important to recognize that learning must be made meaningful. Meaningful learning is described as active -- where students are engaged; constructive -- where new builds on the old; collaborative -- where sharing is encouraged; intentional -- where achievement of an objective is necessary; conversational -- where social context is valued; contextualized -- where it can be authentic or abstract; and reflective -- where students evidence their learning through articulation (Spiro et al. 1991). As more and more technology (hardware and software) is appropriated in schools and individual classrooms, it is important for the educator to facilitate the assimilation of technology into meaningful experiences for each student.

Partnering with Technology

In many classrooms the "technology" sits in the back corner waiting for the first students to complete their work so it can be turned on to provide drill and practise to enhance skills learned in the classroom. If the school is fortunate enough to have a computer lab, students diligently file down to the room, sit at designated computers and proceed to learn the variety of commands necessary to produce quality work which is evidenced in isolated assignments being handed in for marks, culminating with a unit test to judge knowledge acquisition and skill development. This scenario would be the typical scenario for the educator embracing the instructionist learning theory. Perhaps this is the theory most educators are comfortable with because it limits the amount of knowledge educators have to know, while at the same time providing the students with a common base of subject matter.

The constructivist's classroom may be heard before it is seen. Students are milling about the computer in a classroom or around the computers in a lab setting. A variety of programs have been chosen, by the educator, as appropriate to solve the problem at hand. A problem statement for the lesson has been stated but no objectives have been listed. The computer becomes a tool to assist in the solving of a problem instead of being the center of instruction.

The educator who embraces constructionism, as the predominant theory, has groups of students working together to produce concrete projects. Group 1 is learning about desktop publishing by working on the school newspaper. Group 2 is concerned with setting up a summer business by producing business cards and flyers. Group 3 wants to improve keyboarding skills, while Group 4 needs to be self-expressive in the development of a computer graphics portfolio.

The classroom educator who prescribes to ID2 acknowledges that various students have various degrees of competency with the computer. The school year for these educators begins with common instruction where it is necessary for all students to learn the basics, for example, in word processing. At the end of the lessons, students are responsible for building personal portfolios that will consist of a self-designed business card, a collaborative newspaper, and an item of their choosing. They will be assessed everyday, as well as at the end of the unit when they will turn in their portfolio.

Computers in the classroom are used or integrated in a variety of ways depending upon the learning theory, values, and assumptions the classroom educator has adopted, consciously or unconsciously. Perhaps what is more important are the skills students develop and demonstrate such as critical thinking skills, problem-solving initiatives, creative expression, and responsibility for their own learning, to name a few outcomes (Gokhale, 1995). Perhaps Jonassen (Maddux, 1996) explained it the best when he stated that learning acquisition needs to be divided into three stages: the beginning stage, predominated by instructionist theory to ensure a solid background; the middle stage, predominated by constructionism and ID2, where students produce concrete projects; and the final stage, where constructivism is the predominant choice, to allow students to delve into personal areas of interest and build their own repertoires of personal knowledge.

Perhaps the integration of technology into the home economics program needs to involve components of all the learning theories. Jonassen probably has hit the nail on the head when he stated the stages of technology learning in terms of all three learning theories. The level of technology learning students have varies widely dependent upon the instruction they have received in other courses, previous programs they used, and whether they have access to a computer at home. If we want to successfully integrate technology into our program we may need to instruct students at the beginning of the year, or at the beginning of the module, on the basics of computer operation. Maybe these basic computer operations make educators afraid of computers, perhaps they are unable to instruct the basics and, thus, feel more comfortable with the traditional pen and paper activities. My itinerary may now have a beginning destination but what about assessment?

Assessment

Recently two terms have been used interchangeably when the topic of testing is discussed -- assessment and evaluation. Do these two terms mean the same thing? Fenton (cited in Barnett, 1997) defines assessment as the collection of relevant information which may be relied upon for making decisions. Evaluation is the application of a standard to assess data and produce judgments about the amount and adequacy of the learning which has taken place (Beauchamp & Parsons, 1992). According to Webster (1984) to evaluate means to determine the value of, while assessment means to assign a value to. These two definitions, evaluation and assessment, are actually quite different but does one exclusively measure process or knowledge? If an educator was to prescribe to the definition of learning, whereby, the memorization of facts through instructionistic techniques is practiced, then perhaps evaluation or the determination of a value based on a test mark is appropriate. If an educator were to prescribe to the definition of learning, whereby, knowledge is built upon prior experience through constructivistic techniques, then perhaps assessment or the assignment of a value to performance is appropriate. Assessment and/or evaluation are terms that can be compounded in confusion with the addition of preceding labels -- formative or summative. The latter being associated more with evaluation and the former predominantly linked to assessment. Our highly competitive society determines a student's value through norm-referenced testing; hence, evaluation is often the norm but is it also testing a student's affective learning and skill acquisition?

Assessment can be a tough call in core subjects where students are subjected to rigourous achievement testing to measure their ability to regurgitate facts and definitions but what about the role of assessment in home economics/CTS and technology? These two fields are conducive to assessment as educators in these areas have a tendency to appraise students' abilities to perform tasks as opposed to their ability to restate learned theories and facts. I have struggled with this for years and will continue to on this journey. Home economics/CTS and technology can be categorized as competency based subjects where students' past learning is used to build present learning. Students must be able to thread sewing machines before they can stitch seams and they must be able to turn on computers before they can utilize various programs. But a parent wants to see more than a "basic competency" checkmark on students' report cards -- they want a mark comparing their son(s) or daughter(s) to others in the class. Marking in competency based subjects is redundant and futile. If students can perform tasks they deserve the credit, if they can't then they must redo parts of the learning in order to complete the task.

Accountability

The move towards full accountability in our schools is proceeding in fast forward as educators begin to anticipate questions on achievement tests and diploma exams.

Schools are insisting that students be totally prepared for the test to "do the school good" by achieving above average results. Principals and superintendents are using the school results to evaluate educators, prepare comparative results, and announce to parents the school's and district's standing province wide. But what are these tests examining? Are they testing the student's acquired knowledge level, their ability to recite facts, or their ability to apply previous learning to new situations?

Larson (cited in Harris, 1996, pg. 9) states that "knowledge results when an individual personally transforms information. Knowledge is private, while information is public. Knowledge, therefore, cannot be communicated; only information can be shared." By testing students continuously are we, in fact, testing knowledge or information acquisition? According to Larson, knowledge has to be acquired, processed, internalized, and owned. Knowledge is displayed in actions and reactions, but not necessarily in test results. Students can know facts, but they may not be able to regurgitate the exact combination of answers for the exact question in a stress situation. Some tests are beneficial, but should they be used to determine a student's future placement in society or judge an educator's instructional capability? If the purpose of assessment is to improve learning then perhaps we need alternative assessment strategies which more accurately measure the affective and effective components together (Crisp & Leggett, 1995; McDowell, 1995).

The provincial definition of accountability has personally bothered me. There is so much more to the curriculum than being able to write a test. I try to do so much more in my classes to make the units more exciting. Achievement tests are tying my hands because I HAVE to do well on the tests. If the results, the school receives, are not good, then the administration and parents look first to the teacher, second to the students. Tests are not making students accountable for learning, they are making teachers accountable for pushing through the required curriculum with the capability of having students regurgitate required facts. Is that what education is about?

Authenticism

The purpose of authentic assessment is to provide a broader set of indicators of student learning (McDowell, 1995). Learning does not occur only in the classroom -- students bring a host of experiences which influence learning capacity and capabilities. Some educators and administrators state that norm-referenced tests are the only approach to measuring learning; yet, what about effort, attitude, skill development, critical thinking skills, problem-solving skills, and personal growth? These attributes are as important, if not more important, than the ability to surpass the 50% acceptable standard benchmark indicating competency. Authentic assessment challenges traditional, instructionistic approaches to testing; hence, it must be examined with an open mind. Authentic assessment also becomes more formative and less summative resulting in a better reflection of the criteria required in the real world (Custer, 1996; Linn & Burton, 1994). It is ongoing, dynamic, fluid, and changing (Custer, 1996). It encompasses a wide range of methods which value student input and reflective practise.

Authentic assessment encourages students to take an active role in their assessment thus becoming more responsible and accountable for their learning (LeMahieu, Gitomer & Eresh, 1995). Authentic assessment involves the gathering of a wide range of criteria to best assess or assign value to students (Tomlinson & Henderson, 1995). Although more authentic assessment tools are encouraged, principals and educators prefer norm- referenced tests because they are objective, reliable (for test fact recitation), easy to design, and easy to administer (Burger & Burger, 1994). They also provide a comparative, competitive environment for students, educators, parents, taxpayers, administrators, and the government. However, to what extent to they actually measure knowledge acquisition?

If assessment is more appropriate for home economics and technology then authentic assessment is the "way to go." It's not enough for students to be familiar with the Canada Food Guide, they must also demonstrate their ability to record their dietary recalls with the appropriate computer program to generate a nutritional analysis of their *eating habits. With the assimilation of home economics and technology, students are assessed authenticall, in situations that could emulate situations they may face in their daily life. The combination of home economics and technology is providing them with transferable skills and it is giving them the opportunity to form a lasting association between two fields traditionally situated on opposite ends of the continuum.*

Authentic Tools

Authentic assessment tools are designed to involve students in their own learning and assessment; be ongoing and formative; emphasize continuous learning; mirror real-life situations; evaluate problem-solving situations; and blur the clear and present lines between learning, teaching, and testing (Wiggins in Custer, 1996). One of the environments which encourages the use of authentic assessment strategies is collaboration, where students work together towards the completion of common projects or goals (Perrone, Repenning & Clark, 1996). Authenticism with collaboration encourages the assessment of problem-solving techniques, interpersonal skill development, and effort, to name a few alternative parameters.

For successful collaboration to occur the educator must step away from the front of the class and become a guide and facilitator to the students (Perrone et al. 1996). They must supply avenues and directions for learning while encouraging a problem-solving approach with inquiry. Collaboration encourages teamwork instead of competition and provides valuable skills which students will need to survive in the real world. The Employability Skills Profile (Conference Board of Canada, 1992), which outlines the skills employers value in their employees, highlighted teamwork as one of their top skills however, in school a competitive environment is promoted through academic testing schemata (Gulach, 1994; Perrone et al. 1996). Collaboration is more than small groupings of students working on assigned tasks. Collaboration encourages joint problem-solving, critical thinking, and discussion. It is a social process which encourages sharing through communication (Gulach, 1994; Owston, 1996; Perrone et al. 1996; Rieber, 1992). It is a personal growth process which increases self-esteem, positive perceptions, and a give-and-receive relationship amongst team members (Rieber, 1992).

Within a true collaborative learning situation students are assigned to a particular role or duty in the group setting, each interdependent on others (Ritchie & Wiburg, 1994). These roles change frequently to expose students to a wide variety of experiences and situations. Engaging in collaboration may not be easy for educators. They may not be able to sit back after the groups are formed and work on teaching tasks. They must be continuously circulating, assessing, assisting, observing, noting, and providing learning experiences to enhance students within each group. If collaboration is a relatively new approach for students then introductory time can be spent assisting in problem determination and developing group cohesiveness. Sometimes it is also necessary to monitor individual student contributions to the group to encourage equity and teamwork. Standard assessment tools that judge only a final project are not authentic in collaborative settings. Collaborative assessment encourages peer assessment, individual marks, attitude and effort marks, and personal growth marks (Perrone et al. 1996; Ritchie & Wiburg, 1994). Rubrics and grading tools, which specify criteria for processes and products, are designed to assist the educator in determining criteria for the more affective component of collaboration including knowledge, skills, and attitudes (Custer, 1996).

Rubrics

Engaging in subjective marking is very arbitrary. We have all attempted to mark effort and discovered that as the pile of term papers decreased our latitude on effort increased. Rubrics are scoring tools or checklists designed to clarify educator and student expectations prior to engagement in a collaborative or individual task (Custer, 1996). The primary purpose is to set out criteria for assessment and alert the students to how they will be assessed and in what areas. We have all used rubrics before but we have probably used alternative labels: checklists, progress charts, grading sheets. In the past, rubrics concentrated on objective tasks instead of subjective components. Collaborative learning environments encourage the assessment of subjective components such as problem-solving, critical thinking and effort. All rubrics focus on:

> measuring a stated or identified performance, objective, behavior or quality; including some form of scale used to rate performance or characteristics; and contain specific and identifiable performance characteristics arranged in levels indicating the degree to which a standard has been met (Custer, 1996, p.32).

Students themselves can use rubrics to assess personal or partner contributions (Ritchie & Wiburg, 1994). Rubrics provide a concrete basis for subjectivity with a high degree of generalizability coupled with well defined scoring parameters (Linn & Burton, 1994). Rubrics may be used in addition to traditional "final project" marking schemata but it is important to recognize individual contributions as well as group collaboration.

Rubrics, by another name, have been used in home economics for some time. The first time I viewed a rubric was when I instituted the student-managed learning philosophy. Within the package was an assessment tool with a scale ranging from 0 to 4 to assess attitude, effor,t and time management with clearly stated parameters differentiating between the levels. Rubrics can be considered a meaningful assessment tool in home economics and technology because they allow educators to assess students' abilities based on distinct levels of competency, and if they fall between two levels then there is also a category. A rubric does not pit students against one another, instead it assesses students based on their own capabilities and competencies.

Portfolios

Portfolios are being used in school, in job search seminars, in performance meetings and for documenting personal goals and strategies. Portfolios, for educational purposes, are collections of student work that can be assessed for growth, development, and quality over a period of time in various content areas (Owston, 1996). Portfolios are an authentic assessment tool which indicate to the educator that the student has been engaged in constructing evidence of personal value and collaboration. It is not a photo album of completed work and it is not just a compilation. Each piece of work in a student's portfolio must be chosen to reflect predetermined criteria as set out by the educator. Each piece of work must be chosen by the student and accompanied by an explanation stating the reasons for inclusion, the growth evidenced, and a self-assessed rubric. Each piece chosen must show evidence of self-reflection (Reckase, 1995; Zahn, Rajkumar & Zahn, 1996).

Barnett (1997) states that an effective portfolio should contain the following elements:

- Learner Goals
- Guidelines for selection of materials
- Work samples, chosen by both student and teacher
- Teacher feedback
- Student self-reflection
- Clear/appropriate criteria for evaluating work (rubrics based on standards)
- Standards and Exemplars; examples of good work

Portfolios are very individual. They cannot be judged on a comparative nature. Students' portfolios speak for them; hence, they are very subjective and not objective, qualitative and not quantitative (Crisp & Leggett, 1995). The most difficult component of the portfolio involves self-assessment. Educators do not encourage enough self-assessment although this is one task students will engage in frequently when they enter the workforce (Zahn, Rajkumar & Zahn, 1996; Adams & King, 1995).

Self-reflection

By engaging students in self-assessment, educators and administrators can get a clearer picture as to what makes each student "tick" (Kusnic & Finley, 1993) Although self-assessment can be a time consuming procedure, it is more indicative of the degree of individual learning which has occurred, than the traditional "end-of-unit" tests which test only rote knowledge (Crisp & Leggett, 1995). Self-assessment or reflective learning can be accomplished in many ways: students can write about their learning experiences; students can elaborate on each piece in their portfolio and why they chose it; students can describe what they learned and extrapolate how to use the knowledge; or students can indicate experiences where they used their learning to make personal journeys more meaningful. There is no right or wrong way to engage in self-assessment or reflective practise. The primary key is to provide students with an alternative to which they can apply their critical thinking skills and increase their individual control over their own learning (Brown Wear & Harris, 1994; Kusnic & Finley, 1993; MacGregor, 1993). Self-assessment also encourages valuable exchanges between students and educators providing opportunities to share expectations for the students' performances, while, at the same time, resulting in a opportunity for individual professional development for the educator (LeMahieu et al. 1995).

Many other tools and strategies encourage self-reflection, self-assessment, performance based assessment and authentic assessment. It is important to realize that these tools must be used in collaboration with norm-referenced criteria due to the competitive accountability the Alberta government encourages in educational institutions throughout the province. The ideal learning environment changes daily yet, it consistently focuses on four dimensions: content, methods, sequencing and sociology (Strommen & Lincoln, 1995). Regardless of the fact that governments determine success through content, educators must be prepared to acknowledge the other three dimensions in classes in order to provide a meaningful learning experience for our students. It is important to realize that any assessment system must be judged based on the value of the information it provides to the students, parents, educators, administrators, and community members (Barnett, 1997). Perhaps the integration and utilization of technology in our learning environments will encourage students, parents, and administrators to look at alternatives to the instructionism predominant in today's classes.

Delivering Education

Espinoza, Whatley & Cartwright (1996) note that, for many years, dating back to 1892 in North America, educators have been looking for and discovering alternative ways of delivering "education" for students who could not or did not want to study the traditional way -- in the classroom listening to the educator. Home schoolers, isolated students, delinquents, missionary children, sick, and bedridden students -- they have been able to learn through the use of correspondence lessons, which are prepackaged lessons delivered complete with objectives, assignments, and tests. Upon completion, the written activities were sent to a central marker and later returned to the student with the earned grade. Soon correspondence was updated to distance education as more and more schools visualized students studying courses that schools could not feasibly offer due to low enrollment and lack of expertise (Ely, 1989). Students completed their prepackaged lessons during an allotted time under the supervision of a classroom educator and "faxed" lessons to a tutor marker. If students needed assistance, it was usually limited to the classroom educator or the tutor marker. Maintaining the traditional objectivist or instructionist theory, where activities were designed to be sequential, students were expected to build upon skills and knowledge "taught" in prior lessons (Gillette, 1996; Jonassen et al. 1995). This method of instructional delivery has worked for many students; however, there are many students whose needs have not been met through distance education.

Self-initiative, self-motivation and a desire for learning via paper-and-pencil activities are key characteristics for successful learning in distance education. Often distance education students are isolated in a classroom with the other distance education students and expected to work diligently and quietly for long periods of time. Lack of verbalization, social interaction, and intellectual isolation are key limitations to a system designed to meet the needs of small, rural schools twenty to thirty years ago (Savard, Mitchell, Abrami & Corso, 1995). With the available technology can educators not make distance education more inviting and engaging, more interactive and applicable?

It is all starting to come together. Technology, home economics, authentic assessment, portfolios, rubrics, self-reflection and constructionism coupled with some instructionism -- they can all co-exist in a classroom program designed to maximize student choice. The purpose of my journey is becoming clearer, the route to travel is beginning to stand out, the itinerary more solidified. But what about communication and *the mode of delivery? How do I begin to integrate all the necessary components into a deliverable, teachable, learnable, technology based, home economics program?*

Computer Mediated Communication

Computer-mediated communication (CMC) involves the direct or indirect exchange of information between two or more people using a computer as the primary interface (Abi-Raad, 1996). If two people are communicating simultaneously, in real time, CMC is referred to as synchronous, but, if there is a delay in receipt and response, it is termed asynchronous (Burge, 1994; Jonassen, 1996; Miller, 1994). Electronic mail (e-mail), bulletin board postings, listservs, usenets, telephones, and fax machines are all designated asynchronous whereas chat rooms, telephone communications, and video conferencing are deemed synchronous.

Asynchronous CMC, when combined with distance education, provides students with an avenue to seek personal assistance from the educator or facilitator who receives the e-mail. Although the communication is time-delayed, replies posted with e-mail are generally more current and timely, which help students engage in active interaction with the educator or facilitator (Burge, 1994; Craig, 1995). Students also have the opportunity to communicate, brainstorm, share ideas, solve problems, and work on group projects with other students. CMC provides a degree of anonymity to the students, protects their privacy, and connects them with the expertise not often found in small, rural schools (Arms, 1996; Owston, 1995; Savard et al. 1995). Although there is the chance that students can waste time and become disinterested in this type of nonpersonal communication, the facilitator often encourages students to discuss areas of concerns with him/herself or with other students (Savard et al. 1995). Collaborative projects, which students can engage in, provide an avenue for peer teaching and peer assessment. For example, AT&T Learning Circles were designed to encourage collaborative projects by providing students with an opportunity to work with other students from around the world. Students' quality of writing, proofing, and editing were greatly improved as they treated the participants in the circle as cohorts.

Other avenues provided for students to work collaboratively through projects include I*EARN, SchoolNet and The Global Schoolhouse. They remove physical and geographical boundaries as well as ease the sense of isolation many students feel when they are involved in distance education (Burge, 1994). In the past few years CMC has been combined with multimedia[1] and hypermedia[2] to make collaboration more interactive[3] and engaging.

Multimedia and Hypermedia

Prior to the early 1990's CMC was often combined with distance education to provide students with an alternate form of delivery. At the same time, companies were designing software packages specifically for the education market, that students could use to practise skills, learn new information or simulate real-life events. These software packages, which were the descendants of the computer based instruction (CBI) and computer assisted learning (CAL) software packages of the 1970s and 1980s, provided students with more engaging interactivity to make learning appealing to three of the five senses. The discernible difference between multimedia, which came first, and hypermedia is that the former is any piece of software which is combined with another media such as video, audio, or graphics. Hypermedia combines multimedia with hypertext[4] which allows specific "links" in the software to connect to other frames or screens. Hence a learner, using hypermedia, could click on the camera to see the photo or click on the highlighted word to hear its pronunciation. With the use of the Internet[5] and the World Wide Web[6] increasing exponentially in educational settings, hypermedia and hypertext are providing a prime opportunity to engage students in highly interactive, highly visual, engaging learning environments.

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[1] Multimedia - a computerized environment that combines at least one other media (graphics, audio, video) with text

[2] Hypermedia - a computerized learning environment that integrates audio, text, graphics, video and learner involvement resulting in a multimodal approach to education (Reed, Ayersman & Liu, 1995, p.298).

[3] Interactive - mutual action between the learner, the learning system and the learning materials (Resnick, 1996).

[4] Hypertext - a collection of nodes (pieces of text) connected by links that allow the learner to access other information from a prescribed starting point (Ward & Davis, 1994).

Internet and World Wide Web

The Internet is a worldwide system of networks that was initially used by the United States Department of Defense to connect researchers. It was later expanded by the National Science Foundation to increase the base of researchers connected and today it connects schools, businesses, private corporations, and individuals resulting in an interlinked, interfaced global playground (Burbules & Callister, 1996). The World Wide Web (WWW) became the next add-on to the Internet, breaking the large network into nodes for easier traffic control connectivity. It was developed by CERN, Geneva's European Laboratory for High Energy Particle Physics, and like the Internet was a tool to allow researchers to share information. Unfortunately the interface provided by the Internet and the World Wide Web (WWW) was not user-friendly and people often became lost and confused as they navigated around the maze looking for valuable information.

Client servers, like America On Line, Prodigy and Compuserve, provided the next phase for taming the Internet. These servers provided an interface that made searching for information easier and more accessible. They would gather pertinent information for their clients and place it on their servers for their customers to use. Since these companies charged for accessing and downloading, the fees soon added up. Access to the Internet and the World Wide Web (WWW) was still unreachable or frustrating for some individuals and companies so Netscape and Mosaic were created as interfaces directly connecting users to the WWW without having to pay astronomical fees to client servers.

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[5] Internet - a worldwide system of networks initially used by the United States Department of Defense to connect researchers; later expanded by the National Science Foundation to increase the base of researchers; today connects schools, businesses, private corporations and individuals in a global interface (Burbules & Callister, 1996).

[6] World Wide Web - a node system designed by CERN, Geneva's European Laboratory for High Energy Particle Physics, to more adequately link researchers together via the Internet for the sharing of information (Miller, 1994).

Netscape and Mosaic, together with the newest member on the block, Microsoft Explorer, make searching for information more fun, while decreasing the chances of getting "hypertracked"[7] or lost in hypermedia. With this new technology, increased creative opportunities are available for educators to custom design their software especially created to meet the needs of particular students.

Home economics and technology. The logocentrism implied through the simultaneous use of these two terms is becoming faded. Yes, they can be merged. Yes, home economics can be taught with technology. Yes, technology can be used to enhance students' grasp of concepts in home economics through the use of authentic settings. I have had the opportunity to examine my pedagogical underpinnings and I find them searching for a marriage between instructionism and constructionism. At this time I cannot let one go totally, not in an education world that places value on evaluation, scores, tests, and averages, but I can begin to assimilate ideas from both theories in an effort to create meaningful learning environments for my students.

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[7] **Hypertracked - a term used to designate getting lost in the vast arena known as the Internet by continually following "links" until the one loses sight of their original intention (Bennett, 1996).**

CHAPTER TWO

DETERMINING THE ROUTE: DEVELOPING THE QUESTION

Linking theory with practise

Instructionism, constructivism, constructionism, CBL, CAL, WWW, Internet -- these are just words to some but to individual educators, myself in particular, they are very meaningful. These terms label perspectives/theories and provide substance for ways in which things have been done or they provide impetus for change and direction. For me, these terms signify a journey which began several years ago.

As an educator with a home economics background, I soon became the computer technician when it was discovered I had the two necessary prerequisites: CMPT120 on my transcript and a computer at home. Seven years ago "technology" meant teaching computer studies to grade seven students regardless of their interest or background -- we were preparing these students for their future on 8088's! Similar to other educators seven years ago, I was not comfortable with trying new ideas. In fact I knew of no other instructional method than standing in front of the class. I was an instructionist and I needed to get a good evaluation!

With a continuing contract in hand, I soon discovered student-directed learning in my home economics lab and computer room. Soon I was developing and designing modules while maintaining a comfortable rigidity. This rigidity was soon to end as I kept challenging myself to prevent boredom and disillusionment (mine and the students). I discovered that I enjoyed pushing the limits, trying new ideas, attempting new strategies, much to the chagrin of my principal and superintendent. No one ever came into my classroom to observe because they were unsure of what they would witness. Students bandaged in triangulars, CPR practise, eggs for babies, pots clanging in the computer room, jujubes on top of monitors -- I was open to new ideas and believed in a hands-on approach to learning. Soon this became boring. Students who had been exposed to computers for a few years now needed a change! Telecommunications was next as I became instrumental with AT&T Learning Circles. Students from my classes were working on common projects with students in England, San Francisco, New Mexico, and New Jersey.

From participation as a circle school, our class soon became the co-ordinating school compiling the final project and initiating communication with other schools. Then another idea came to my head -- how about students teaching adults about computers? The project was developed and funded by ATA Education Trust and my love of research commenced. The research project involved the grade eight keyboarding class instructing adults in basic computer operations and word processing while, assigning homework and marking assignments!

As the talk about Career and Technology Studies (CTS) infiltrated the province, I was on the bandwagon piloting courses, developing modules, implementing student-directed learning and embedding technology where I could but, with no computer in the lab! Pizza sales and catering for six months raised enough money to purchase a computer for the CTS lab. Technology was beginning to bridge two domains that were perceived to be at opposite ends of the continuum.

This background leads to the question I am exploring. Technology has been treated as its own entity in the past, when it needs to be integrated into every subject in order to encourage students to understand its usefulness in every day life. I had been teaching at opposite ends of the continuum for too long and I needed to bridge the gap between home economics education and technology. I wanted to use technology to offer students choice in their timetable. I wanted to use technology to encourage networking. I wanted to use technology to bridge the gap between urban and rural schools. I wanted to use technology to encourage students to become responsible learners. World Wide Web (WWW), electronic mail (e-mail) and the Internet were tools available for the students to use. Technology needed to be utilized by educators and students but to do so effectively required an attitude change, an instructional methodology change, a change in assessment strategy, and initially a change in pedagogical thinking.

I have been growing professionally for many years, now I want to implement my ideas and concepts to students to try something different so that students can become involved in and responsible for their learning as they experiment with alternative assessment techniques, and begin to explore the world beyond the four walls of their classroom. I see technology as a methodology instead of a subject.

The Problem

Career and Technology Studies (CTS) was scheduled for mandatory implementation in Alberta in September, 1997. This program is designed around twenty-two strands which replaces the former Industrial Arts, Home Economics, Vocational Education, and Business Studies courses. CTS is a modularized program allowing students maximum choice dependent upon the strands and modules schools decide to offer. Some schools will limit module choice based on facility; other schools adapt instructional strategies to maximize student choice. Educators will have as much choice in the delivery of the instruction. Some educators may choose to offer a totally student-directed program; whereas, other educators may choose the modules thereby limiting available choices to students. Furthermore, other educators will offer a combination of student-directed and teacher-directed modules. As the school year begins in Alberta, there remains many administrators and educators unaware of the impact this program may have on the existing infrastructure, student choice, and/or integration of technology.

The push for technology integration can be another impetus pushing the site-based management regime of the schools. Keeping up with the latest technology, ensuring students are computer literate, and integrating technology curriculum wide are relevant issues in Alberta's schools. Unfortunately, the Foods and Fashion labs are often the last to receive technical equipment. Home economics/CTS and technology are still viewed as existing at opposite ends of the continuum; hence, the implementation of CTS without the technology in Foods and Fashion may not be serving the needs of the students.

The modularized CTS program, and several needs including the need for: technology in the Foods and Fashion labs, increased student choice, consistent course content, and linkages to subject area specialists, are important needs for any small, rural school implementing new CTS curriculum. Several small schools are unable to maximize student choice due to limited module offerings and/or the lack of an available subject area specialist to instruct students. Technology may be able to supply these schools with the additional assistance they need to offer a more varied program to the students.

The Question

As I struggled to connect technology and home economics/CTS the research question that illuminated my path was:

> **How will the use of Internet technology facilitate student choice in CTS Foods modules through the provision of an electronic delivery and support network for the educator and the student(s)?**

The key components I wished to explore in my research question included:

- How can the Internet and the World Wide Web be used as a delivery strategy to facilitate student choice in CTS Foods?

  Many small, rural schools are hooked to the Internet and use the World Wide Web to initiate student research and collaborative projects. If this technology could be harnessed as a delivery strategy, what would the modules look like? How could the modules be made interactive and engaging? Would the Internet be a feasible choice to increase student choice in CTS Foods?

- How can alternative assessment strategies be used to assess students' progress?

  If the modules could be successfully offered using the WWW then an exploration study needed to be conducted into effective assessment techniques for the student(s) and classroom educator. Some of the areas of concern surrounded the possibility that the classroom educator may not have a sufficient background for assessing the necessary components in Food Studies or the school may not have appropriate lab facilities for completion of practical labs and projects.

- How can an electronic support network be created to benefit the students, educators, and subject specialists?

  Students and educators, in small schools, often work and teach in isolation on modules of choice. The WWW has the potential to link students and educators to other students working on the same project, to educators who can offer additional advice, and to experts in the field.

Dialoguing and Justifying

My initial idea for my study came to me over a year ago when a parent from a small, rural town approached me about teaching sewing or cooking. She was disappointed that students in her town school did not have the same opportunities as students in other schools due to the lack of facilities.

I filed her concern away in my head, occasionally thinking about it when time permitted. I could offer private sewing lesson;, I could begin a 4-H club; I could encourage home study -- the possibilities were endless; yet, distance, time and money were constricting factors. I could even approach the principal about offering modules I developed so that students would get credit for the work they did outside the class, but what if no one at that school had a background in home economics?

As I talked to more and more people there seemed to be a definite apathy. Former educators were telling me that cooking classes had been offered before but they were not successful -- cooking in the temporary storage room was not conducive to learning. Other people were telling me that students could take home economics through distance education so what would be the advantage of offering it live? It seemed as if I were fighting a losing battle only to have the idea of transporting students to neighboring schools brought up again and again. Students lose valuable learning time sitting on a bus traveling from school to school and the opportunity for work after school was impossible. There had to be a better way!

The availability of technology, the Internet and the WWW brought the issue closer to home. Perhaps students could access work on the 'Net -- my wheels were turning now. Then another brick wall -- anyone can teach cooking and sewing, why would they take it on the 'Net? I sensed a general lack of appreciation for home economics educators; after all, they just taught cooking and sewing! But, I decided that, as our numbers and/or our subject areas dwindle in schools across Alberta it was imperative that I try my best to support a subject area which I personally feel is important. The creation and implementation of CTS assisted in the resurrection of some programs yet, home economics and technology were still not being appropriately linked. The modularization of CTS, the encouragement for student-directed learning, the push for maximum student choice -- these all seemed to be issues which would finally link home economics and technology. What if I could design webpages to market my modules and have students complete their work in their classrooms? Yes, that would work except for the practical lab components. What if I could design alternative assessment tools for educators, students, and parents to use to judge the product and the process? Yes, that was a possibility.

As I discussed my project with fellow students and educators they didn't seem to be as excited as I was. After all Cyberhigh and Academy On Line were up and running so what I was proposing was already functioning, wasn't it? I adamantly believed that what I wanted to do was different. I did not want to have students connect and study from home, I wanted to increase their choice from within the classroom. My electronic modules would provide another tool to supplement the classroom educator's repertoire. After all learning is a social event which requires verbalization, collaboration, and group cohesiveness, especially in home economics! It is not enough to have a student visit a bakery or see how to construct a piece of clothing through only the visual sense, it is necessary for students to feel the dough and handle the cloth in order to get a true sense of accomplishment and pride (Craig, 1995). My method of electronic delivery would encourage the collaboration and socialization students needed as well as look at alternative ways of experiencing the hands-on without the facilities at school.

Still I seemed to be staring at a wall --why wasn't this getting any easier? Several more "doubters" of my study insisted that what I was proposing was distance education. What would stop students from linking onto my website and proceeding to print all the pages necessary to complete the module. After much pondering I decided that yes, they *could do this if they wanted but that was defeating the whole idea. What if I decided to change an assignment or embed a response sheet -- the students wouldn't realize this until it was too late. Updating information with a website is easier than photocopying a new page, inserting it into the new modules, creating new worksheets and updating the students' checklists. I had just finished the seventh revision to my FOD101*[8] *modules - there had to be an easier way!*

Okay, my site would be different but how come I would only access scanned gifs[9] and not utilize jpeg[10] and mpeg[11] files? Technology is progressing faster than ever before except in schools, especially in small, rural schools. Several schools are still working with 286's which were the most up-to-date technology only five years ago. Some rural schools are fortunate to have extinct 486's but the ability to download jpeg and mpeg files while still actively engaging students in constructive activities -- that is only a dream! I wanted my study to focus on designing a website using the lowest common denominator, simple yet, effective gifs to illustrate specific concepts. Home economics, albeit modularized and primarily student-directed, still encompasses demonstrations of important basic concepts necessary to build a solid framework for each student. It was important to incorporate demonstrations and I proposed demonstrating the techniques through sequential photography.

So what about marking? Are you going to have students send projects to you to be marked? What will the classroom educator be doing? More questions, more doubtful glances. Many classroom educators feel that the only way to assess students is to mark their work. Alternatives to this methodology may be discussed, but they are definitely not practised. If my study was going to work I would have to encourage alternative assessment strategies because how would the industrial arts educator, who may be in charge of the class, know how to mark a basting sample or determine the flakiness of a pie crust? Thoughts of student self-assessment came to me. Students are often overlooked as the best judges of their own work. We need to give them a chance to develop self-reflective assessment techniques because they will need that skill in the "real world." The expertise of the parents in the community was another thought that came to me. Collaborative home/school based projects, such as those required for home economics, can motivate students and encourage parental involvement (Miller & McInerney, 1994). Parents also directly benefit from seeing their children at work, evaluating their processes, and encouraging self-assessment.

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[8] FOD101 - the modules in the new Career and Technology Studies program are coded with three letters and three numbers with 101 being the introductory module. FOD101 is the code number for prerequisite Basic Foods module in the Food Studies strand.

[9] GIF - Graphic Interchange Format - developed by Compuserve for platform independent images. GIF graphics can be viewed on Macintosh or IBM and will appear the same (Castro, 1996).

[10] Jpeg - a compression scheme that allows photographs with millions of colours to be saved with a limited number of colours. Since the human eye cannot distinguish between the millions of colours, the graphic image is compressed and a number of colours eliminated to reduce space (Castro,1996).

[11] Mpeg - Moving Picture Experts Group - compressed digital video/audio that translates to 704x480 pixels at 30 frames per second in North America (IMA, 1996).

The more barriers which were thrust in front of me, the more determined I became. The more doubtful glances I received, the more I want to prove it could be done! It's hard to believe that in this age of technology and its successful integration into our schools, there remains people skeptical of its advantages. I have often felt that many of my ideas were ahead of their time, hence I am often the one "out on the limb." This study would be no different. I would be building my study from the ground up — "constructing" my knowledge as the project proceeds, building upon past experiences, supplying a firm background to the students selected for the study, examining alternative assessment strategies, listening to student input and concerns, and changing my pedagogical attitude towards education, learning and teaching.

Developing the Research Design

Integrating a Personal Journey with Action Research

I have been an innovative educator over the past seven years, never settling for status quo. Invent, revamp, attempt, discard, reinvent — this process seems second nature to me. I am very much involved in action research. As an educator I was engaging in action research everyday, I just didn't realize it nor did I write about it.

Every time I tried something new in my class (and it worked) I was rejuvenated, revitalized and ready to share my ideas with other professionals.

Action research was originally developed by Kurt Lewin in the 1940's and 1950's in an attempt to improve the quality of instruction (Lebrow & Wager, 1994). The intention of action research is to support educators as they attempt to carry out and practise innovative strategies in the classroom in a reflective manner (Altricher, Posch & Somekh, 1993). It provides educators the opportunity to systematically evaluate, adjust, and re-evaluate their practises as a way of growing professionally and personally as they experiment with new ideas and strategies (McLean, 1995; Altricher et al, 1993). Action research focuses on utilizing the educator as the researcher. As educators, we seldom refer to ourselves as researchers but, in essence, everytime we try something new we are researchers. Action research takes place in a naturalistic setting -- the classroom (McKernan, 1991). Educators spend the largest portion of their day in the classroom in front of students; hence, when we act as researchers and examine our practises then it is only logical that the setting be the classroom where we can actually see the effects of our research in action.

Action research, although heavily used in the social sciences, is primarily used in the area of curriculum development, professional development and self-evaluation (McKernan, 1991). Elliott (cited in McKernan, 1991, p.31) and Altricher et al (1993) have outlined several distinguishing features of action research and in the following section I will integrate how these concepts will be addressed in the proposed study.

- Action research examines problems with are deemed problematic by practitioners.

  With the constant increase in pupil:educator ratio, the classes in small, rural schools are becoming larger, the diversity of the class is becoming greater and in some cases several subjects and grades are being placed in one room with one educator. Recent implementation of CTS in Alberta has resulted in a lack of exposure to CTS Foods modules due to lack of facilities, expertise and funding. These factors are increasing the gap between the have schools and the have not schools.

- These problems are deemed solvable.

  As more and more schools become "linked" with technology, the possibility of offering a variety of CTS Foods modules to small, rural schools increases exponentially. The Internet can provide the interface that can ultimately "link" student and educator without being in the same room.

- Such problems require a practical response.

  The intertwining of technology and CTS Foods would require a computer based instruction core offered through the Internet, incorporating alternative assessment techniques, e-mail communication between a subject specialist and the student, together with an interactive web site as a solution to the problem.

- Action research suspends a full definition of the situation until exploratory research is undertaken.

  I cannot propose an hypothesis for my research question because I do not know what I will find: maybe this study will be timely and the need for this merging of technology with CTS Foods is what is needed; maybe this study will point to deficiencies that cannot be addressed until more work is done; maybe this study will focus on the need for e-mail and conferencing -- the future is unknown.

- The goal is to deepen the researcher's understanding of the problem.

  My proposed solution to the problem may be very superficial requiring a more in-depth examination of the problem. I hope to expand my knowledge of Internet technology, electronic module delivery and alternative assessment strategies on my journey to making CTS more accessible to small, rural schools.

- Action research uses case study methodology in an attempt to "tell a story" about what is going on and how events hang together.

  I will be focusing my study on Carbon School, a small, rural school in the Golden Hills Regional Division #15 which does not offer a CTS Foods strand due to the lack of facilities and a qualified educator. This study will be about my story and their story as we attempt to create a solution to this problem. Carbon School and the Golden Hills Regional Division #15 have chosen to remain identified as participants in this study.

- The action research is reported in terms of the perceptions and beliefs of those in the setting -- educators, children, etc.

  The data collection methods that I will utilize will include e-mail conversations, participant observations, field researcher comments, diaries, response journals and student opinions. It will be important to gather opinions of everyone who has a stake in this study.

- Action research uses the language of everyday discourse employed by the participants.

  My research questions, methodology, and findings will be discussed and written with the classroom educator in mind. I want my study to be easily discernible and usable by other classroom educators and it is important for me to be candid and report the findings accurately.

- Action research can only be validated in unconstrained dialogue by the participants.

  As I begin to decipher the research findings and determine categories and themes (grounded theory) I will be returning to my participants -- the students and the classroom educator -- to verify the results and obtain their input or translation. As I will be heavily involved in the research as an observer and participant in classroom discussions and problem-solving, I will need to check my conclusions against the perceptions of the students, field educator, and parent participants.

- There must be a free flow of information within the support groups and between actors in the project.

  It will be my intention to leave all lines of communication open among students, parents, field educator, principal, researcher and school board. A two-way communication field will be encouraged and utilized.

Although my study does not conform to an exclusive action research application, the distinguishing features as previously outlined by Elliott have been addressed. Furthermore I have integrated my personal journey to illuminate the paths which have been followed. My ultimate goal in this study is to develop a new method of offering CTS modules to accentuate my core offerings when I return to my classroom. I would like to see the gap between home economics/CTS and technology reduced or eliminated and I would like to see an alternative delivery strategy for CTS modules designed to benefit students in small, rural schools. The personal journey combined with action research will fulfill my need to be involved at the classroom level while remaining a collaborative researcher.

The Research Site

Action research, being a qualitative methodology, focuses on a small group of participants due to the fact that the researcher/educator is investigating a situation or problem with personal or professional significance. This study was carried out in Carbon School, a small K-12 school situated in the village of Carbon, Alberta. Most of the students are rural students who live on neighboring farms while the remainder reside in the village of approximately 600. Carbon School is located within the boundaries of Golden Hills Regional Division #15, a division recently amalgamated from the separate entities of Three Hills, Wheatland and Drumheller Valley. I chose Carbon as the research site because it was close to my residence. The school offered CTS but no foods modules, they were hooked to the Internet through SchoolNet, and the classroom educator was excited about working in a collaborative research setting.

The Subjects

After I made the initial decision to carry out my research at Carbon School, I submitted letters (Appendix A) to the Golden Hills School Board, Dr. Garry McKinnon, Superintendent, and Mr. Dave Stewart, Principal of Carbon School. The letter outlined the research question, the rationale for the research, the proposed data collection methodology and my personal interest in carrying out this research. At this time it was also mentioned that ethical approval had been obtained from the Department of Secondary Education at the University of Alberta. Consent was granted from all parties to proceed with the research as initially described.

Once the consent letters were received I scheduled a meeting with Mrs. Jerilyn McGill, the classroom educator with whom I would be collaborating in this research. Jerilyn was responsible for teaching CTS Information Processing so she was very familiar with the modularized approach to learning encouraged in the CTS curriculum. Being the information processing educator, Jerilyn was also equipped with extensive technological experience that would be beneficial to the students who decided to enroll in CTS Foods. CTS was offered to all the Grade 8 and 9 students during the last forty minute period of every day, on a rotating three day cycle together with Environmental Studies and Health. This would mean that any students who volunteered to participate in this study would, in fact, have access to the computer every third day. There was some concern expressed over the time allotted for the completion of one module as most schools offer 240 minutes of practical arts time each week as opposed to a maximum of 80 minutes in Carbon. It was proposed, at this time, that if any of the students needed extra time on the computer, release time from their other two option courses could be secured. With the logistics worked out, an introductory meeting was scheduled and an initial letter was sent home with all the junior high students (Appendix B). It was decided that if more than three or four student/parent teams wished to participate then the input of the principal, vice principal and classroom educator would be used to determine the final participants.

In casual conversation, Mrs. McGill noted that she talked to a lot of students who seemed excited about the project, but weren't willing to make the potential time commitment. I was getting a little disappointed at the potential number everytime we talked to each other. Initially I was expecting to turn away students or have Mr. Stewart and Mrs. McGill choose the final participants based on past and potential work skills. I was also hoping for a mixed gender grouping with at least an even complement of boys and girls.

The date for the introductory meeting was set for February 19, 1997 at 7:00 p.m., at Carbon School, at which time the initial website would be demonstrated, the research project discussed and consent forms handed to students and parents who were interested. The agenda for the meeting (Appendix C) covered the rationale of the project, the research methodology, the time line and the proposed content of the FOD101 module. Prior to the meeting Jerilyn had confirmed that three students, and possibly four, were interested in participating in the research project. The projected size of the research group(s) is important to note. A group of three or four is an ideal size due to the fact that a group any larger may break into self defeating smaller factions. This size of group can easily divide the duties in a foods labs and similarly this size of group can easily function in the home kitchen setting where the majority of the labs were to be carried out.

After I heard there were four students interested I was ecstatic! I would be able to do this research after all. I was starting to get a little worried that there wouldn't be enough interest despite the fact that these students had not been offered home economics. Jerilyn said one the students might be a Grade 6 student but she wasn't worried because she was one of her strongest students. The only problem Jerilyn relayed to me was the fact that she saw one student on Day 2 and the other two students on Day 3. This had the potential to create some difficulties but we would worry about that later.

The night of the meeting arrived and two parents and three students showed up. The introductory letter had requested parent attendance at the initial meeting. It was important to have the parents' support because they too would be working collaboratively with the classroom educator and researcher in this study. One parent was unable to attend due to prior commitments, Mr. Stewart would be late and one other student/parent team would attend later -- the meeting was ready to begin.

I was a little apprehensive prior to and at the beginning of the meeting. I knew I was enthusiastic about my own project but I didn't know if I could generate that enthusiasm in others. As a home economics educator I knew what could be done with the Internet but how was I to explain all the "techie" terms without losing the potential participants?

After the initial introduction and rationale to the project was described, the first unit on the FOD101 website was demonstrated to the participants. I did not use a "live" connection to the Internet. The students and parents viewed the contents of the website as a "pseudo" connection with the file contents contained on my computer. They were really excited about the potential of the project, the content of the site, the fact that I was a local educator, and the fact that finally some students would have the opportunity to study home economics. At this time all ethical considerations were relayed verbally and in written form to the potential participants. Consent forms (Appendix D) were handed out to the participants with directions to return them to Mrs. McGill if they were interested in participating; questions were answered by Mr. Stewart, Mrs. McGill and myself; the site was viewed again -- the evening was coming to a successful close. One parent/student team decided that they couldn't participate because their schedule was too busy. This student was in Grade 6 whereas the other potentially interested students were in Grade 8 and 9.

The next day Jerilyn called me. She had received all three consent forms back from the students who were interested. It was a go!

Yes! I couldn't believe it -- from a positive introductory meeting in December, to consent forms signed and returned, to the hurdles overcome with class scheduling, to three firm participant teams, I couldn't believe it was finally happening. After the meeting I was still uneasy but Jerilyn said it was great and that her questions were all answered as well. I guess when they say the road is rockiest before the study actually begins they weren't joking!

The study was now ready to evolve and Carbon School was ready to teach home economics! Although the website was constructed simultaneously as the study progressed I will deal with its development as a separate entity in the following chapter.

CHAPTER THREE

A JOURNEY WITHIN A JOURNEY: DEVELOPING THE WEBSITE

Home pages, web sites, URL's[12], HTML[13] -- these were all new terms to me less than a year ago and they continue to remain new to many educators and students in Alberta. Although the use of the Internet, with its wealth of information, can be beneficial in the classroom many schools do not have Internet "hook-ups." With all the negative "hype" about the Internet infiltrating the media, parents and educators find it very difficult to condone its use if they do not immediately see its benefit. Pornography, hate mail, chat rooms, secret love affairs -- these are some of the things that are associated with the Internet, but there are many excellent research sites, school home pages, weblinks to universities and research institutions, real-time connections to space, and conversations with educators and students across the globe. The Internet does have the potential to reduce the miles between students, educators, and parents in this world re-emphasizing the need for a more global education.

Why the Internet?

Software packages, computer based tutorial (CBT) programs, computer assisted learning packages -- these are some of the tools used in schools today. As new technology becomes available, the old is often relegated to the storage cupboard. Software packages and computer based training packages have a definite shelflife as new editions become available each year. One example would be CBT packages for DOS[14] systems used in the early 1990's. Today, students don't understand DOS and have no need to study DOS as the computer interface has become more user-friendly with Windows and Windows '95[15]. Many educators purchased CBT packages years ago because of they were just as new to the technology as their students were. As educators become more computer literate, there is a great dissatisfaction expressed over the commercial CBT packages available prompting more and more educators to write their own programs (US Dept. Of Education, 1996). Although the use of the Internet and web based course design is a relatively new concept, it provides an alternative to educators who wish to write modules and lessons for their students. We have all experienced a time when our newly produced "learning packages" were just stapled together and, much to our chagrin, new technology was released by the major corporations. The Internet provides an opportunity to update information with ease, to change information if students become bored, and to revise activities to add more student input (US Dept. Of Education, 1996). If students have the choice to sit in front of an Internet course as opposed to a pre-packaged software tutorial they will choose the former due to its "newness", the opportunity to "surf"[16] and the possibility of speaking to people in far away lands. The Internet continues to hold a great fascination for students and educators but it may take a shift in pedagogy to use it effectively.

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[12] URL - uniform resource locator - another name for address; it contains the information about where a file is andwhat a browser should do with it (Castro, 1996).

[13] HTML - hypertext markup language - the computer programming language that allows you to add "tags" to an ASCII text file, that when transferred to a browser, will appear as a webpage (Castro, 1996).

A Constructivist's Paradise

Every student using the Internet today comes into class with different levels of knowledge or prior learning. Some students have totally immersed themselves in the technology behind the Internet, others can find the sites of movie stars, others have developed efficiency in setting up chat rooms, and others haven't even clicked the "go"

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[14] DOS - Disk Operating System designed by Microsoft to provide an interface between the computer and the human user (Jacobs, 1997).

[15] Windows and Windows'95 - Graphical interfaces used with computers today to shield the human user from the inner workings of the DOS based personal computer (Jacobs, 1997).

[16] Surf - term used to signify travelling on the Internet (ILC, 1994).

button. With a huge array of student experience and student desire for the information they want to learn, educators are faced with a dilemma -- to teach to the middle and risk losing those who desire more information or are scared of technology, or to design lessons and activities based on a student's prior knowledge allowing them to construct their own knowledge base. Constructivist educators have identified that learner control is at the very heart of the hypermedia and multimedia environment that the Internet produces (Craig, 1995; Maddux, 1996) and that by engaging in these environments, students are actually constructing knowledge (Reed et al, 1995). This may be difficult for educators to grasp as they have controlled their classrooms.

However, only a certain percentage of the students in our classes are able to handle the exploratory, non-linear, non-sequencing approach used in total constructivist learning (Jonassen, 1991 and Cobb et al, 1992, cited in Maddux, 1996). Just as there are different learning styles in traditional classrooms; there are different learning styles on the computer -- an issue that needs to be addressed. If an educator could design a website lesson that captivated students' imaginations, that encouraged the learning of new concepts, that was linear for those students who needed linear or who had limited prior knowledge (Adams & King, 1995) with non-linear components for students who wished to expand their knowledge beyond the required, then an ideal lesson would be the result (Jategaonkar & Babu, 1995). The Internet does provide the opportunity to do this, but similar to traditional lessons and lesson plans, it does take planning time up front to successfully implement it.

The use of the Internet as an instructional delivery mode provides other benefits as well. With the capability to update information at the "click of a button", educators are able to change assignments, add new information, revamp weblinks, and correct mistakes almost instantaneously (Anderson & Joerg, 1996; Miller, 1994). Gone are the days when educators had to photocopy a new page, tear apart modules, insert the new page, and restaple the package. This opportunity is a cost-saving device for schools in a day of education cutbacks. The Internet also provides an excellent opportunity for modular-based learning (Nicholson et al, 1994). Students accessing the Internet can essentially be working on different modules at the same time while remaining engaged in a learning atmosphere. Of course this can also cause a problem if there is two or more students need to use the Internet at the same time and there is only one connection! But, for the student who wants to work on a module individually or who has no partners to work with, the Internet provides an ideal opportunity for individualized learning. The Internet also provides an opportunity for educators to present information to students in a new and exciting way. Students today are very stimulus oriented. Learning needs to be active, enticing and appealing to hold their attention; however, in school they open textbooks and write papers (US Dept. Of Education, 1996)? There needs to be a balance between the traditional learning styles and the styles that exist in society today. The Internet also provides opportunities for students to engage in multiple passes through the material that is puzzling to them. With lessons and activities on the Internet, students can return to the pages that give them trouble at anytime for remediation (Poncelet & Proctor, 1993).

With every new technology there remains opposition in the ranks. Many educators think that the Internet will replace them in the classrooms (Klemm & Snell, 1996). Although the Internet has been around for a few years there is not a general move to replace educators with the Internet. Cyberhigh and Academy On Line are being touted as the "wave of the future" but they are not designed for every student. They are designed for the motivated, self-starter student with initiative and drive, who can work independently with no supervision -- there are limited numbers of students who fit that description!

The resistance that classroom educators are putting forward may not be due to job insecurity, but personal insecurity. Lumsden and Norris (cited in Reed et al, 1995) have highlighted two other reasons for the resistance besides the threat to basic securities (job), a) the change is not understood and, b) the change is perceived as being imposed. Many schools are "hooking up" with grants that are being supplied without consideration for the educators that have to use it. Some administrators feel that if the Internet is brought to the school, educators will flock to use it. However, many educators do not understand it, have heard only the negative about it, do not have the necessary skills, or are unable to change pedagogically to make the Internet's use in the class beneficial for their students. A study recently carried out at the University of Alberta (Gibson & Oberg, 1997) discovered that the Internet is not heavily used in schools, that educators are doing traditional activities on the Internet, and that administrator support is the determining factor to its use in the school.

There is a place for the Internet in classrooms of today and of the future. The Internet has the many observable advantages; it has the potential for collaborative learning; it has the ability to develop critical thinking skills; it has the ability to support a variety of teaching and learning styles; it has the ability to encourage multi-sensory learning; and it has the potential to sustain the test of time (Belanger & Clement,1995; Hirumi & Bermudez, 1996; Maddux, 1996; Miller, 1994; Winslow, 1996; US Dept.of Education, 1996).

Designing the Website

Designing a website can include a fancy, interactive introduction and an initial homepage to capture students' attentions but the website needs to hang on to students, captivate their attention, make learning fun and interactive, combine graphics and text yet, not be "too much" for their senses to handle. Prior to developing the website for this study I surfed the web looking for sites that might appeal to my senses. I found a few but I was sorely disappointed to find that the introductory page was glittery and neat while all the subsequent pages had students "read pages x to y", answer the questions contained on this site and submit answer sheet for marking. Other than the homepage there were no graphics, no interactive feedback, no non-traditional learning -- it was traditional pen-and-paper activities disguised as a website. I wanted my site to be more than a "wolf in sheep's clothing." Some of the key points I considered during the design of my website were:

- The presentation of the information had to be captivating and appropriate (Dringus, 1995).

  I wanted to prepare a site that looked like a foods course. It was important to have the students associate the site with food to streamline their train of thought when they began to study the information on the website.

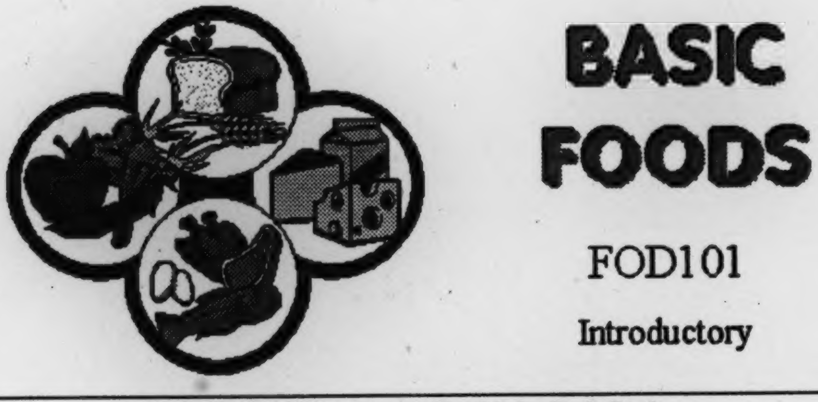

Figure 1 - Opening Header Graphic for Basic Foods

Occasionally with commercial websites it is hard to distinguish the product being promoted with the graphics on the homepage. I wanted the students to immediately associate food, cooking, and nutrition with the homepage to get them "tuned in" to the content contained on the website.

- Adequate guidepoints and navigational buttons to reduce students frustration in getting lost (Trentin, 1996).

  A major concern with the Internet is the potential for students to get hypertracked with the amount of text and information available. A solution to this problem is to have suitable navigational buttons to allow a student to go back, to return to the title page or to go ahead.

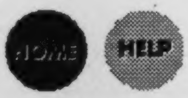

Figure 2 - Navigational buttons

Some technicians would say "that is what the Back button is for on the Netscape menu bar" yet, many people are not familiar with the different interfaces before they jump on the Internet. The Back button takes the user back to the pervious page they were on and not necessarily back to the top of the assignment. By using navigational buttons on the webpages you are reducing the possibility of a student getting lost (Ward & Davis, 1994).

- Limiting the amount of new information on a page (McFarland, 1995; Shaw, 1994).
  Students can only read a certain amount of information before they become fatigued. By reducing the amount of new information on a page the possibility of a student finishing that page is increased. The concept of a student reading off the computer screen is a new one and many students cannot hold focus for a long period of time due to the glare from the screen and the constant "refresh mode" some screens may have. The smaller the DPI[17] on the screen, the clearer the words and graphics. Some schools do not have expensive screens that would have a low DPI resulting in eye strain for some students.
- Incorporating a subtle background colour for webpages.
  Colour can be a controversial topic. We have all been subjected to bright and bold homepages, to neon colours and flashing buttons, but are we able to learn from them? We don't see textbooks written in flashy colours. The pages throughout the years have remained white for a very good reason. Light from the windows and fixtures in a classroom that hit a white book page and reflect back to the user's eyes allow a clearer visibility path. If students had to read off black pages all day, students would suffer from headaches and inattentiveness while educators would suffer from learning problems and disruptions. The same holds true for websites. A subtle, light background colour is easier for the students to handle and easier for them to read.

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[17] DPI - Dots per inch - the greater the number of dots per inch on a computer monitor the higher the resolution, resulting in a clearer more precise picture; .28 DPI results in a better picture than .33 DPI (Howe, 1997).

- Using a consistent and associative colouring schemata throughout the website (McFarland, 1995; Shaw, 1994).

  In Canada, citizens are trained at a early age that red means stop, yellow means warning, and green means go. These colours are referred to as associative colours. It doesn't matter where we see them or in what context they are used, we refer back to red means stop. The same theme needs to be re-enacted in websites. If students are to STOP and complete a test before proceeding, then it should be in red. If students are to proceed to the answer key for marking, then it should be in green. If students are to be warned that they may experience difficulty, then it should be in yellow or amber. Other colours are associated with the Internet as well. The default settings on the Netscape and Explorer interfaces is blue and underlined for a "hotlink." Students are now associating "blue and underline" as a link to take them somewhere else, so we don't want to confuse students with underlined text or blue text not used in conjunction with each other. If a student visits a link and returns to the original page, the default is for the blue and underlined text to turn purple. This allows students to see in a glance which links they have visited and which links they need to visit. By changing this link colour, students get confused if the colour is not clearly outlined at the beginning of the module.

- Using text and illustrations appropriately to complement each other (McFarland, 1995; Trentin, 1996).

  The ability to create and import graphics at the "click of a button" has made many websites graphic heavy, graphic redundant, even graphic crazy. Multi-sensory humans have a propensity for graphics. Illustrations are looked at first in a book. Animated gifs that move on a webpage are immediately honed in on. Pictures are looked at before words are read. The graphics and text on a webpage need to complement each other.

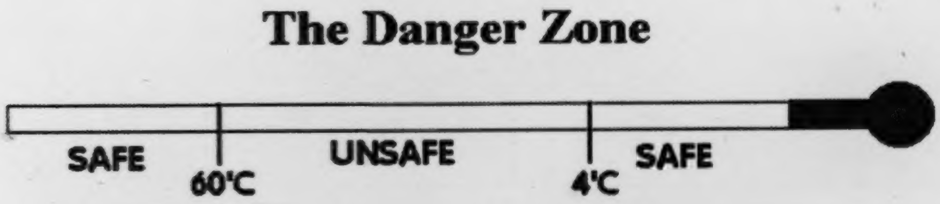
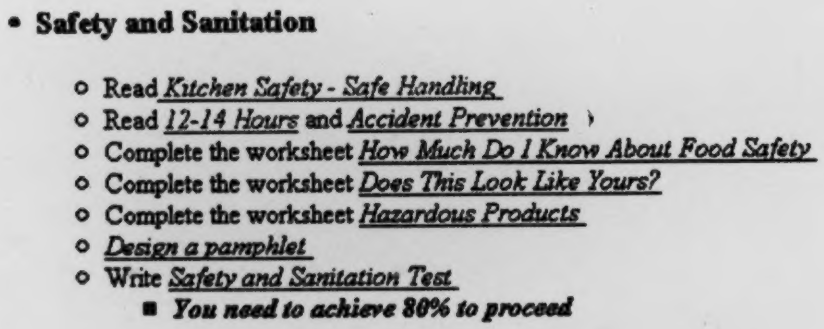


Figure 3 - Graphic complementing text for "The Danger Zone" activity

Students need to gather information from both sources in order to complete their picture. Graphics that animate do not necessarily 'deter" students from learning but rather distract their train of thought from the content of the lesson and make it hard for them to return to the material that is relevant (Rieber, 1996). Material that is presented only in text format is not conducive to retention. The use of graphics breaks up the computer screen and makes it easier for the student to read. Chao & Cennamo (1996) report that students who learned key concepts retained their level of knowledge when the instruction was coupled with graphics.

- Structuring webpages to guide the students through the activities (Espinoza, et al, 1996).

  Successful webpages are conducive to students working in a prescribed pattern through the required activities. True constructivists would not support this method of instruction because it takes away from the student constructing their learning based on their previous knowledge. Since Basic Foods (FOD101) is a prerequisite module for all other cooking modules in CTS Foods it is important that all students receive a consistent background in the rudiments of sanitation, cooking principles and nutrition in order to prepare them for the modules to come.



- **Safety and Sanitation**
  - Read *Kitchen Safety - Safe Handling*
  - Read *12-14 Hours* and *Accident Prevention*
  - Complete the worksheet *How Much Do I Know About Food Safety*
  - Complete the worksheet *Does This Look Like Yours?*
  - Complete the worksheet *Hazardous Products*
  - *Design a pamphlet*
  - Write *Safety and Sanitation Test*
    - ***You need to achieve 80% to proceed***

Figure 4 - Example of linear layout for activity completion

Therefore, it was necessary to take into account the linear design consideration in order to ensure the students received all the pertinent information (Schroeder & Kenny, 1995). Students entering the module with little prior experience need to build their repertoire and the best way to accomplish this is through the linear model (Reed, Spuck & Bozeman, 1996). Towards the end of the module, after the introductory information was covered, students were encouraged to engage in discovery learning as they surfed for information about making pizzas.

- The consistent use of a feedback mechanism so that students could get help as soon as they experienced it.

Several feedback mechanisms were built into the site to ensure students could get help when they needed it, that feedback was timely and efficient and that allowances were made to inform students of their strengths and weaknesses. The navigational buttons on each page including a HELP button that immediately linked to an e-mail screen (See Figure 2 - Navigational buttons). This provided students with the opportunity to ask immediate questions about the information they were receiving without having to exit the program, start up an e-mail program and send their request. To ensure students were on track with their learning, STOP buttons were used to gauge students' learning. When students finished an important section such as safety and sanitation, they would click on the stop button. This action would take them to the next screen which was a response form.

Figure 5 - STOP button for progress check

1. Food poisoning is a deadly phenomenon caused by lack of sanitation. How do you think "knowing" about how to prevent food poisoning will change your food preparation techniques?

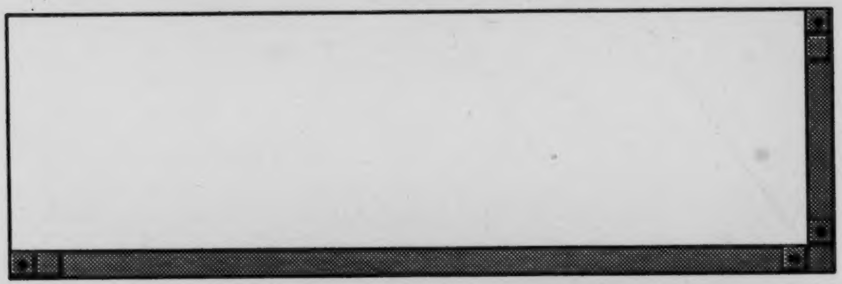


Figure 6 - Example progress question at STOP button

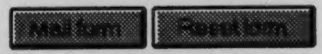
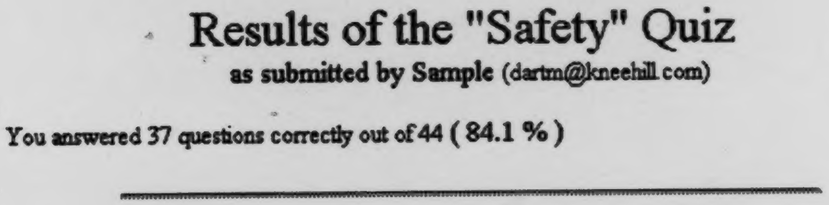


Figure 7 - Send form button to e-mail completed progress questions

The students would fill out this form and submit it to the server which would immediately send it to my e-mail address so that I could read their answers, check their answers, and provide them with feedback. This mechanism would also provide the opportunity to suggest ideas for enrichment or remediation if a problem was detected (Espinoza, et al, 1996).

Another feedback mechanism used in this website was the use of CGI scripts [18] to provide immediate feedback to the students when they submitted their tests for marking. It was important for this feedback to be immediate as the students could not progress onto the next activity unless they had achieved a certain percentage. By having the webmaster, Mr. Dann St. Pierre, write a script that would input the students' answers, compare them with the correct answers, and submit back a homepage with their total mark, students would be able to continue onto the next assignment knowing they had achieved the desired percentage.



Results of the "Safety" Quiz

as submitted by Sample (dartm@kneehill.com)

You answered 37 questions correctly out of 44 (84.1 %)

Figure 8 - Example of homepage sent to student after test submission

- The ability to proceed with the activities even if a connection was unavailable.

  The inability to log on or the inability to get to the proper address are two key factors cited when students express frustration over the use of the Internet (Anderson & Joerg, 1996). I attempted to design an alternative to the "live connection" by making the CTS Foods website as independent as possible. By this I mean I designed the website to be self-sufficient and not dependent upon a live connection except to access the tests and the help button. If the students were unable to connect to the server, then they would have the option of accessing the website from the disk provided. All the information on the website would be on the disk allowing the students to continue on with their work. I built this mechanism into my website because there may be schools in Alberta that would like to access this site for their classroom but cannot complete the activities on-line due to long distance charges incurred by the hook-up.

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[18] CGI Scripts - Common Gateway Interface Scripts - written to capture information the user places into on-line forms, radio buttons, or check boxes for the purpose of comparing the data to preset answers in a database or text file on the system server and generating a reply back to the user (Espinoza et al, 1996).

- Incorporating a variety of instructional strategies to keep the learner involved (Arms, 1996).

  Many on-line courses use one method of instruction despite the fact that the website had the capability of being interactive. I wanted the students to be exposed to a variety of instructional strategies so that they could be as involved as possible in their own learning. Some of the strategies used were: reading webpages and answering on-line questions; answering questions and e-mailing responses; working through an on-line demonstration complete with photos of the steps; submitting test answers for immediate response; hot-linking to other pertinent sites for information; and using prepackaged software to simultaneously answer questions on a webpage. Videos, sound, movie clips, and chat rooms could have been added to the site but I felt that they were not essential to the content of the module and that by adding these files the webpages become cumbersome to download and slow to run. I factored the lowest common denominator into my website, that being, not all schools have the latest machines with the latest technology hooked up to the Internet. If students have to sit and wait for the webpages to download due to intense graphics or video files then they will lose interest and create discipline problems for the educator who is instructing the rest of the class.

Throughout the entire design process it was important for me to keep referring to Gagne's nine events of instruction (Wagner & Gagne, 1988 cited in Overbaugh, 1994; Gilette, 1996) so that the website I designed met the criteria for good instructional material:

1. **Gaining attention**: Graphics, hot links, colour were used strategically to gain and hold the students' attention.
2. **Informing learners of objectives**: Objectives and learning expectations were clearly outlined on the default page. Students would have to scroll through the entire page before reaching the "click here to proceed" button.

3. **Stimulating recall**: After important concepts were presented to students they would have to take progress tests and recall concepts previously learned.
4. **Presenting stimuli with distinctive features**: Lessons were made as intriguing and thought provoking as possible.
5. **Providing learning guidance**: Students responded to questions embedded in the website and submitted them to the researcher's mailbox for monitoring.
6. **Eliciting performance:** Through the use of portfolios and competency based assessment students had the option of aspiring for three different levels of competency.
7. **Providing feedback**: The CGI scripts used for the safety and sanitation test, measuring test and final test would provide immediate and timely progress reports to the students with the option to retake the tests.
8. **Assessing performance:** Interactive tests, e-mail responses, e-mail test results, database building for test results, labs, rubrics, self-assessment sheets, portfolios, and parental lab assessment sheets would be used to assess the students' performance.
9. **Enhancing retention and transfer**: The combination of on-line activities with the use of practical lab activities assisted in students' retaining and transferring knowledge from one domain to another.

Although the website was designed "on the fly" as the students participated in the study, it is important to differentiate the website construction from the results of the study. Certain components of the website will be discussed in the next chapter as they directly affected the students' responses to the content.

To review the research question:

> **How will the use of Internet technology facilitate student choice in CTS Foods modules through the provision of an electronic delivery and support network for the educator and student?**

Key components of the question are:

- How can the Internet and the World Wide Web be used as a delivery strategy to facilitate student choice in CTS Foods?
- How can alternative assessment strategies be used to assess students' progress?
- How can an electronic support network be created to benefit the students, educators and subject specialists?

CHAPTER FOUR

THE JOURNEY CONTINUES: THE STUDY PROGRESSES

Once the consent forms were received back from students and parents the study was ready to continue. The students were excited about participating in the research and each had their own reason for joining:

> I thought that it would help me learn how to work on the Internet, and it also gave me the chance of taking Home Economics. (Reflection log entry, Student A)
>
> I was interested in taking Food Basics using the Internet technology because I used to live in A Town and I still keep in contact with them and I remember them always saying how cool Home Economics was. Since our school was so small, we have never had the option so when the option came to us, I wanted to take it. (Reflection log entry, Student B)
>
> I was interested in taking this course because I wanted to learn more about using the Internet and I wanted to prepare myself for the future. I could do this by taking this course because it taught me food basics and a lot more about cooking that I did not know before. (Reflection log entry, Student C)
>
> I am excited for my daughter. (Conversation with parent)

The introductory meeting that was held in February answered student and parent questions as well as outlined the course expectations together with student and parent responsibilities. The students commented that they were very aware of all of their expectations prior to beginning the on-line course.

> They (the expectations) were made clear to me from the moment I wanted to become part of this. (Reflection log entry, Student B)

The students were made aware of the fact that they would be writing in journals, conversing via e-mail, writing reflection logs and completing self-assessments throughout the study. They were aware that their opinions and ideas would be used to determine the successes and failures of the project. Together with the student data collection, Jerilyn also was instructed to maintain a reflection log and anecdotal record. The parents were asked to maintain observation journals. The use of several collection methods was to ensure that the data could be triangulated for the purpose of making changes to the website and determining the merits of on-line course delivery. With the students ready to begin working and the expectations clearly outlined it was time to link Carbon School with the rest of the world.

Getting Hooked

Since Carbon School was hooked up to the Internet via the Industry Canada network referred to as SchoolNet, it was important to ensure that a reliable hookup could be secured. Jerilyn had expressed concern with the SchoolNet hookup because it seemed as if it was always down when she wanted to use it for school projects. The number that the school dialed to access SchoolNet was a local Drumheller number but after several inquiry calls it was determined that the link was extremely busy during the day and not totally reliable. A local exchange number needed to be dialed to access the Internet as Carbon School would not support any long distance charges for this study. After a few phone calls were made to neighboring schools in the division, I decided to purchase a three month account with a local Internet Service Provider for the school. This purchase would ensure that the school had a reliable hookup to the Internet for the duration of the project although they could experience busy times due to the daytime connection required for the students.

After the subscription was purchased the configuration of the computer remained. This proved to be more than a simple procedure as the Internet was on the "educator" computer and changes to the program manager required deciphering the hidden codes embedded in the win.ini file. The Netscape and Eudora software programs sent to the school and installed on this computer to access SchoolNet were configured to essentially be bomb proof. Unfortunately this created a problem as the software would not recognize changes to the configuration system so that access could be secured through another Internet Service Provider (ISP). After more attempts to reconfigure the existing software I gave up and installed the programs provided through my own ISP. Unfortunately the hookup could not be tested because the local ISP server would be down until March 4th.

I couldn't believe the hassles we were having configuring the school system. Although Jerilyn was the computer educator she was the first one to admit that her forte was not technical and that the Internet was rarely used in the school. I could see why after making several attempts to connect using SchoolNet. It definitely wasn't reliable and it was difficult to go anywhere fast. The vice-principal was able to connect once in the evening during the past week. To smooth matters over, I decided to purchase the subscription for the school. This would save some headaches and allow the students to get on the site a whole lot sooner. The students were getting anxious to begin their module work and we kept having to delay due to technical difficulties. I thought it was going to be a whole lot easier, boy, was I wrong!

With the connection ready to go, the students couldn't wait to try out the new site. Then, another glitch. After the subscription had been secured at the ISP, I had faxed Jerilyn the network configuration data to enter into her computer. There was one problem though, the last person to configure the TCPMan software had erased the login.cmd file therefore Jerilyn could not register the necessary changes. Without these changes, the students wouldn't be able to connect. Another hurdle, another setback. I returned to the school to add a login.cmd the next weekend.

I wonder if this project was even meant to be. It seems as if it is one problem after another. I can sense the frustration in Jerilyn's voice as well because she does not have time to solve these problems. She has to maintain a full teaching load plus work on this collaborative project. The students were scheduled to begin a week ago and now there is another delay. Fortunately I had left the homepage disk with Jerilyn so she has had the students working on the worksheets that are on the disk. Thank goodness I planned the homepage to be readable from a file otherwise the students would be really falling behind.

Another glitch I hadn't counted on! As I was working on the website formatting test pages and worksheets I decided to print off several pages. The radio buttons and the text boxes weren't printing! It was necessary to print the boxes so that the students could enter their answers and then print off the worksheet to add to their portfolios. After several hectic phone calls it was determined that the computer had to run Netscape 3.0 in order to format the buttons and boxes. Unfortunately the program was too big to access from disk therefore it had to be downloaded from an FTP[19] site. Jerilyn and I tried to download the file from a remote site but after an hour of waiting we discovered that the program would take at least three hours to download with an excellent connection, and no down time due to traffic load. Dann provided us another option to try. He would place his Netscape 3.0 file at his FTP site and we could download from his server. It would not take as long because he restricts use of his server. The three hour download was reduced to two and finally we had an up-to-date copy of Netscape for the students to use. Another setback, more time for Jerilyn to spend on the computer attempting to achieve total compatibility.

The posting of the website was creating several headaches as well. I had arranged for the site to be posted with my local ISP in my allotted homepage space but I had not thoroughly investigated the use of CGI Scripts. The books I was using to write the pages talked about CGI scripts and PERL[20] as if they were another programming manipulation to be added to a page.

When I discussed the possibility of arranging CGI-Bin space with my local ISP he was very curt and distant implying that it was too much work to write a script. Write a script? Nothing was said about writing or programming in the book?

After an anxious e-mail to the former partner of kneehill.com I discovered that incorporating CGI scripts into a website involves the webmaster writing a program in PERL to read the incoming information and compare it to stored text in order to generate a database of accessible information. Fortunately Dann was excited about the CTS project and was willing to write the scripts, set aside space for the website and offer technical assistance where ever needed.

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[19] FTP - File Transfer Protocol - FTP is a special way to login to another Internet site for the purposes of retrieving and/or sending files (ILC, 1994).

[20] PERL - practicale extraction and report language - One of the computer programming languages that is used to write executable CGI scripts (Howe, 1997).

I really had my eyes opened up with this CGI script stuff. If I had known that it involved writing a program then I probably wouldn't have pursued the interactive testing on the website. But it seemed so perfect! Students would fill in their answers, submit their test and bingo – it would be marked. I didn't want Jerilyn to be responsible for any marking because she was already too busy – and wasn't the Internet supposed to make things easier?

It was done. The CTS Foods website had a URL address and site space (http://cts.kodiaknet.com). Now people all over the world could view the module and offer their advice or have their students engage in on-line learning. I was beginning to doubt this would ever happen and now -- it's here! Jerilyn and I started celebrating the little things that were beginning to happen instead of waiting for the whole picture to come to light.

> One good thing is that I am accessing your help button in hazardous products, which we couldn't get into previously. I think that is a good sign. (E-mail message, Jerilyn, 3/16/97).

But no sooner was the website up and running when another glitch appeared to test our patience.

> ... this isn't working! We cannot input any information (little dots to signal either true or false). For some reason it will not work. If there a trick that I am not aware of? (E-mail message, Jerilyn, 3/18/97).

The problem Jerilyn and the students experienced was with the "What Do You Know About Food Safety" worksheet. The students were to read the questions and select "true" or "false" using the radio buttons provided on the sheet. For some unknown reason they were unable to click on the buttons and choose one or the other. I tried the page at home and at another terminal and everything seemed to be working. I attempted to FTP a new page to the website address but it didn't change the page at Carbon. Again I was stumped and so was Jerilyn. I instructed her to dump her cache[21] on the machine but after e-mailing her instructions on how to do it, FTP'ing a new page to update the one they were having problems with, and changing a few settings, the result was the same. Another visit to the school was forthcoming, this time I would be asking Dann to join us to see if other problems existed on the machine.

With the machine at Carbon School reconfigured to accept the changes we had entered at the beginning of the study, it looked like the students were finally ready to progress without anymore glitches.

> We had a problem logging on initially but got on eventually. I think I will have the system up and running for them before they even get to class. It took probably about 10 minutes to get on today, with no DNS entry and so forth. I think it's good that they know how to do it themselves but it sure does restrict their time. What do you think? (E-mail message, Jerilyn, 3/18/97).
>
> The DNS entry has to do with whether the site is busy. You could log on at noonhour (when businesses are eating lunch) and leave it logged into Netscape until the (students) got there. This would ensure they would get on. Just an idea! (E-mail message, researcher, 3/18/97).

Another glitch to overcome. Jerilyn expressed concern that the students kept getting bumped out of their connection. They would connect to the server, call up the site, and begin working on their activities. About half way through the class period the server would indicate that they had been disconnected. I advised Jerilyn to try to set the Eudora program to check for mail every five minutes. Some ISP's have a built in check system so that clients don't sit on the Internet doing nothing. After a set period of time of inactivity from a logged on site, the ISP will disconnect the user so that other people who may be waiting to connect can try to login. Unfortunately, this caused some headaches with the students because the CTS site was designed to be self supporting, meaning that once they were logged on, they didn't have to "link" to other sites unless they wanted to send e-mail or submit a test for grading. As a result they kept getting bumped from their connection due to inactivity.

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[21] cache - a small fast memory holding recently accessed data, designed to speed up subsequent access to the same data. This temporary cache assists in a faster access time to previous websites visited, especially if the site has not changed (Howe, 1997).

> I changed the checking of mail for every five minutes. I think I'll leave this site up for about an hour or so to see if we are ever disconnected. (E-mail message, Jerilyn, 3/24/97).
>
> We only lost our connection once. That was after I had someone else on the Internet. She couldn't get anything (no DNS entry) so she quit, but then we lost our connection. It seems to be quite busy at 2:30 or so as compared with 12:30 when I originally logged on. (E-mail message, Jerilyn, 3/24/97).
>
> I had it set today for 5 minutes the whole time. There was only one time that I didn't have Eudora open though. That caused me a problem. So, It seems that having Eudora open with the 5 minute setting has worked. Hopefully, that will continue. (E-mail message, Jerilyn, 3/24/97).

The technology problems that persisted through the first month of the research proved to be beneficial as well. Not only did Jerilyn learn to resolve minor glitches but in the end she learned more about the Internet and troubleshooting. The students also learned how to solve little problems. At first they were frustrated with the dialogue box that kept saying "no DNS entry" but learned after a few tries that it was like getting a busy signal when they called their friends.

> Once we were finally established, the students were very interested in how the technology worked and liked to be able to fix problems on their own. This was a feeling of satisfaction for them and for myself. When I saw that they had been able to solve their own problems (or me actually being able to solve one!), we all felt satisfied and proud. (Reflection log entry, Jerilyn)

Whew! The techno problems are finally solved. I'm a little disappointed that it took almost a month before we could solve all of the problems but I guess that is the *price we pay for technology. I couldn't even imagine trying to solve all the problems we encountered from a distance because it took some "hands-on" to actually fix the glitches. Sure, Jerilyn could have had someone come in but she is too busy with all her split classes and besides I got her into this study, now I have to make it as user friendly as possible. I've had a few days where I just want to bang my head on the wall and throw my hands up in defeat but then I decide to grit my teeth and repeat frenetically "I love technology, I love technology, I love tech....*

The Website

The first unit of the Basic Foods website was created and demonstrated to the students and parents during the introductory meeting. We did not have a live connection at the meeting, instead I demonstrated the fact that the students could access a large percentage of the activities and assignments from the disk that would be supplied to Jerilyn as a backup. This helped the parents and students understand the difference between an active or live connection and an inactive connection. The initial worksheets, the on-line measuring demonstration and the navigation buttons were highlighted and their use explained to the parents. Although the safety and sanitation test was not active, the explanation about what "would" happen caught their fascination.

I think the parents were a little skeptical about the website and the course contents because we all remember the demonstrations we had to endure in our home economics courses. How would the students learn the proper way to measure from a website. Once I demonstrated how I incorporated "live" demonstrations into the website a sense of satisfaction permeated the room.

Home economics educators like to demonstrate basic procedures and skills to students because that ensures they are exposed to the same information and begin with the same background knowledge. I wanted my on-line demonstration to be attractive to home economics educators as well so I spent time formatting the webpage. I did not incorporate large mpeg files to frustrate students as they waited for the file to download. I chose to take photographs of a students actually performing the same steps I would demonstrate, digitize them using a flatbed scanner, reduce the colour bitmap from one million colours (standard when scanning photographs) to 128-colour for a speedier download. This process did not decrease the quality of the image drastically yet, it resulted in a much quicker download. The text that accompanied each photo was the exact text that I would use during an in-class demonstration.

Brown sugar can be measured "packed" and "unpacked."

For both methods:

- fill measure to overflowing
- ensure there are no empty spaces
- for unpacked brown sugar, level the top with a metal spatula and dump sugar into your mixing bowl

Figure 9 - Example of scanned photo used in on-line measuring demonstration

This same procedure was used for the equipment identification pages where students identified all the equipment illustrated in the photograph and then proceeded to an answer key to correct their answers. The students expressed some concern over the quality of the pictures.

> I do think that the on-line demonstration and equipment identification pages were as effective as learning about the techniques and tools in a school lab setting because then they are presenting something this small usually if you are sitting at the back of the room, you can't see what they are presenting, so they ask you to come closer. With everyone coming closer, you usually can't see because there are so many people crowded around. This on-line demonstrating way is right I front of you so you don't have to worry about seeing. (Reflection log, student B)

> I think the on-line demonstrations worked extremely well except some of the pictures were hard to tell what was being shown. The captions were easy to understand ... but the pictures could have been better. (Reflection log, student A)

The content of the website directly emulated the print module that I wrote for in-class delivery of FOD101 so every effort was made to keep both delivery strategies consistent with each other. One concern the students expressed was with the worksheet entitled "Does this look like yours?" For this worksheet students were to view a kitchen that broke every safety and sanitation rule and identify the infractions. The illustration that was used was a hand-drawn graphic from the print module that was scanned and digitized.

> In this assignment there are a few confusions. The knife in the sink doesn't look like a knife and the broken glass on the floor doesn't look like glass. (E-mail message, students A and C, 3/17/97)

Every attempt was made to honour the students' opinions so that they, too, contributed to the building of this site.

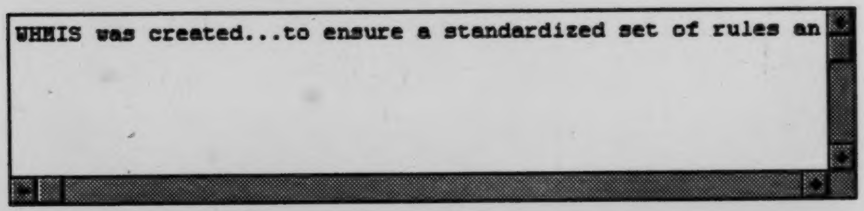
> I got an idea for the kitchen picture - what if the picture was a real photo of a kitchen and not a drawing - would that help? (E-mail message, researcher, 3/19/97)

Students experienced both content and technical problems with the worksheet entitled "Hazardous Products." On this worksheet the students had to define the term WHMIS by referring to their science textbook. On the worksheet I had listed the textbook "Science Is..." instead of the division approved textbook "Science Directions." This caused some confusion which was relayed to me via e-mail.

> We do not have a Science Is...Textbook. Our science textbook is called Science Directions. In it there is nothing about WHMIS and products with B and C labels on them. What should we do. (E-mail message, students A and C, 3/17/97)

I e-mailed back to the students that I had informed them of the incorrect textbook. The information was in the textbook but was not included in the table of contents. This latter dilemma was an oversight on their part. I also suggested that they ask Student C's father as he was the caretaker of the school. On oversight of this nature on print material would have resulted in a new page being inserted into the modules. With the website a simple typing correction, an FTP to the server and the students would see the correction the next time they logged onto that page.

Another oversite on the same page resulted from the use of text boxes for the students to type information into them. With the predominant use of computers in the school, wordwrap has become the industry standard. Wordwrap occurs when the typing reaches the end of the line visible on the screen and the computer automatically begins a new line. The text boxes used on the worksheet did not support wordwrap so the students typed all of their information on one line and were disappointed when only the first few words appeared when they printed the worksheet.



WHMIS was created...to ensure a standardized set of rules an

Figure 10 - Example of textbox with no wordwrap from "Hazardous Products" worksheet

The students had to change their frame of thought when they encountered text boxes so that this wouldn't happen again.

The website was being created and revised at the same time the students were working on it therefore, we experienced other technical difficulties. Netscape uses a built in cache system to speed up downloading time. Every time the students opened up a page, a copy of that page was kept in the cache on the computer. The next time the students visited the page the computer would look to the cache first before determining where to get the page -- the cache or from the server. To expedite the revision process I decided to instruct Jerilyn to "dump" the cache just after I FTP'd a rash of new webpages to the server at kodiaknet.com. As Jerilyn was gaining more confidence with the Netscape program this proved to be an easy task carried out via e-mail.

> I want you to go into (with Main, File Manager) c:\kneehill\netscape\cache and delete all the files that start with MO... These are the files that are "cached" files. This is the first place the computer looks for files for Netscape

> before it goes to the server. I want you to get rid of all these files, start up Netscape and go to the "What do I know..." page where the radio buttons didn't work. (E-mail message, researcher, 3/26/97)

Okay, now I am frustrated. I uploaded a bunch of new files and just assumed they were working. Boy was I wrong! I can't believe it. I don't know what to do. I've e-mailed Dann but can't seem to get a response back from him . (Next day) Yes, I discovered the problem! Refresh only works if pressed immediately after each file transfer - go figure. One more hurdle, one more ounce of success. It's already April and the students are still on the first unit. These technology glitches are really holding them back.

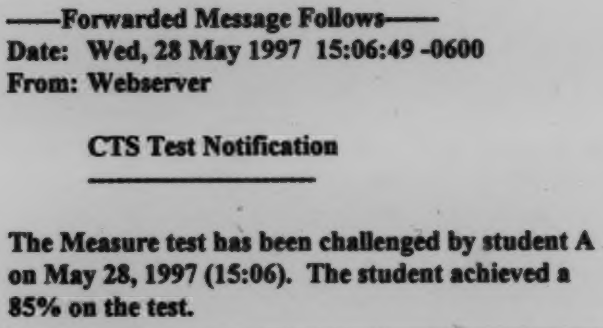
Assessment

Several new and innovative assessment techniques were implemented during this study. Since Jerilyn was not a home economics educator she did not possess the background to assess students without descriptive written criteria. I also did not want to subject her to mounds of marking because then the purpose of having the module on-line would not be beneficial to the classroom educator. During the introductory meeting the students were advised that they would not receive a grade for their work in Basic Foods. Instead they would receive their choice of three marks dependent upon the work completed and displayed in their portfolio. The original intent of CTS was to have it competency based with categories reflecting what the student was able to do. I would be returning to competency based assessment for this study placing the onus on the students to demonstrate, via their portfolio and assessment, their competency levels. Students would have the opportunity to work towards a "Competency with Distinction", a "Competency with Recommendation", or a "Basic Competency." Since the junior high program only indicates module completion this assessment model would not cause any problems with the reporting of grades to Alberta Education. Several of the assessment components integrated into this module included on-line testing, self-assessment rubrics, parent lab assessment, group assessment rubrics, and portfolios.

On-line Testing

The first assessment tool the students completed was the on-line testing built directly into the website. After the first unit was completed the students took the safety and sanitation test to demonstrate their knowledge level. In order to proceed they needed a minimum mark of 80%. Normally students would write a pen-and-paper test, submit it to the educator, who would then grade it, and return it to the student with directions to continue on or restudy. Since the goal of the website was to reduce the amount of paper and educator marking, a webpage was created, a CGI script written by Dann, and the students were able to take the test on-line.

The mechanism behind the safety and sanitation test proved to be the last website problem/success experienced by the students. Due to technical difficulties the students were delayed taking the test. Dann was having problems getting the webpage to generate the student's score together with the comments that were required. After a few trial and error sessions the test worked but now Dann suggested a few more options we could include on the webpage. A command could be embedded into the file to immediately send an e-mail to a pre-determined address at the same time as the student received their mark. This could prove beneficial because students who wanted to retake the test could do so and both marks would be on file. Students who decided to cheat and only record their best mark couldn't because their test taking history would be on file. Unfortunately we didn't get this feature up and running by the time the students took the safety and sanitation test so we decided to activate it on the measuring test.



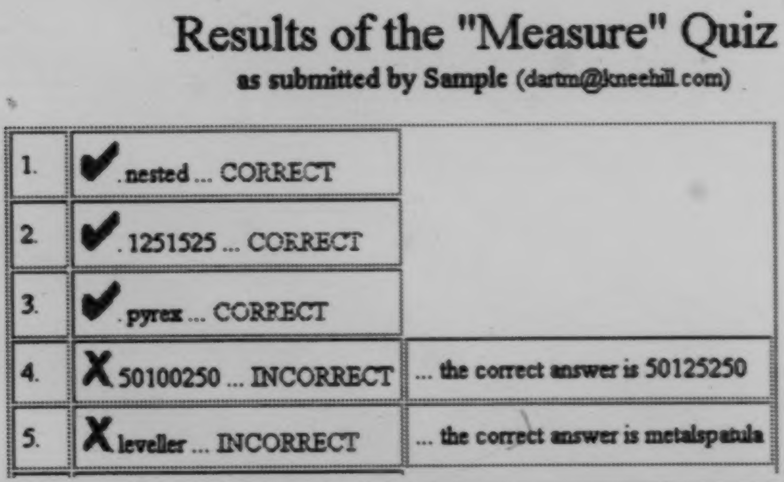
——Forwarded Message Follows——
Date: Wed, 28 May 1997 15:06:49 -0600
From: Webserver

CTS Test Notification

The Measure test has been challenged by student A on May 28, 1997 (15:06). The student achieved a 85% on the test.

Figure 11 - Example of e-mail message sent to researcher indicating test results

Dann also suggested another feature that could be built into the test webpage to generate different response webpages for the students. Two built in features "show correct" and "show detail" could be activated to generate answer keys for students. If the former was activated, the response webpage would show a checkmark or an x for each question the student got right or wrong. This way the student could go back to the test and determine the correct answers to the questions that were wrong. If the latter was activated, the student would see a webpage with the correct answer to the wrong questions. There would be no checkmark or x so the student would have to return to the test to reread the questions. If both features were activated the student would view a page with a checkmark or an x plus the correct answer to the questions they got wrong. I decided not to activate this feature on the safety and sanitation test because I wanted the students to return to the test to re-read the questions to determine which ones they thought were incorrect. The measuring test used both the "show detail" and the "show correct" features for the students.



Results of the "Measure" Quiz

as submitted by Sample (dartm@kneehill.com)

1.	✓ . nested ... CORRECT	
2.	✓ . 1251525 ... CORRECT	
3.	✓ . pyrex ... CORRECT	
4.	✗ 50100250 ... INCORRECT	... the correct answer is 50125250
5.	✗ leveller ... INCORRECT	... the correct answer is metalspatula

Figure 12 - Results webpage illustrating "show detail" and "show correct" options

The tests operated on an honour system; after the students received their marks they would return to the test and "clear form" in preparation for the next student to take their test. The students at Carbon were very honest and cleared the forms, but it would only take one incident where a student who had received 100% could leave the answers on the form, another student could fill in his/her name and submit the test for a perfect grade. Another technical problem to correct at a later date.

> I liked the on-line testing because you get your marks back in seconds. In school we never get a mark back, in a week usually. Some of the things that you could change is how it is setup. This setup was good for an honour system but not everyone is honest. You could have it so they are only allowed to write the test once because people will go in with an attitude like, well if I fail I can just write another one. (Reflection log, Student B)

The server would only compare the students' answers with the text answers entered into the database, therefore, incorrect spelling resulted in an incorrect answer. The server is also case sensitive, so students who entered answers with a capital letter received an incorrect answer. Every attempt was made to set the textbox to fit the correct answer so that students would not be able to enter a larger answer but this proved to provide a way to figure out the correct answer -- something like "fill-in-the-blank" with the number of letters highlighted. The on-line testing proved to be an effective tool but at the present moment for true and false, fill-in-the-blank, and multiple choice tests. The ability to use on-line testing for short answer questions was still being worked on by the webmaster.

For the final test the students were exposed to two testing mechanisms: the on-line test and an e-mail test. At the end of the on-line test submitted for grading, students were directed to chose one of the short answer questions, format their answer in a word processing file, and submit their answer to the researcher's e-mail address. This worked effectively but to make the module more self-sufficient in the future the student could e-mail the educator or a subject area specialist designated by the school.

Self-Assessment Rubrics

Several self-assessment rubrics were formatted for use in this study. The first one the students were exposed to was the "Food Safety Pamphlet Assessment Rubric" (Appendix E). The purpose of this rubric was to have the students assess parameters such as: group participation, self-direction, critical thinking skills, knowledge acquisition, creativity, and reflection. Under each of the objective titles there was a description of the parameter so the students could determine what was meant by each of the terms. The body of the rubric was divided into three categories: distinction, recommendation, and incomplete, to reflect the overall competency categories the students could choose to aspire to in their work. The descriptors used for each of the parameters was clearly described using active terms such as "student uses at least 2 print resources." A weighting mechanism was used because it was determined that parameters such as group participation, self-directiveness and reflectiveness were more important in this activity. After the rubric was completed the students added their score and determined their overall category.

The students were very honest in completing this rubric. They did not give themselves all perfect marks. Students B and C rated their self-directiveness under the recommendation category while student A rated herself a 1 (recommendation) in knowledge acquisition. Overall, all three students ended up with a "distinction" assessment.

> I liked how we got to evaluate ourselves and show how much effort we put in. There aren't any cons to using those sheets. (Reflection log entry, student B)

> The students seemed to like this rubric as it was straight forward and easy to complete. (Reflection log entry, Jerilyn)

The students also had the opportunity to assess their knowledge acquisition level after the completion their 24 hour dietary recall and analysis. In this activity the students wrote down all the food they ate over a 24 hour time period, entered the food into the FoodFocus 3.1 dietary analysis program, and learned what food groups they needed to pay attention to, what nutrients they were lacking, and overall recommendations for a healthy eating plan. After the activity was complete the students rated their knowledge level of their eating habits as well as how easy the FoodFocus program was to use (Appendix F). A Likert scale was used for this evaluation so that the students could rate each statement from 1-strongly agree to 5 - strongly disagree. The students circled other numbers besides the 1 - strongly agree.

The "Self- and Peer Evaluation Form" was used at the end of the module in co-operation with the classroom educator (Appendix G). Each of the students filled out a questionnaire about work habits and group contributions in regard to computer work and lab work. Then students filled out an evaluation on each of their teammates rating them on the same parameters. Jerilyn then mediated a group discussion where each of the students had an opportunity to discuss the strengths and weaknesses of the other group members based solely on the parameters highlighted on the evaluation form. It was a difficult evaluation to carry out but the students were quite successful. They did not rate any of their group members low and the discussion pursuant to the evaluations was constructive and positive.

> I think it great how they get to mark us but sometimes I don't think they are as picky as an educator might be. (Reflection log entry, Student B)
>
> I think that it is an excellent exercise. (Reflection log entry, Jerilyn)

One student felt that the educator should have filled out the assessment instead of the students.

> The only one (assessment sheet) that I did not care for was the group assessment rubric, I felt the teachers should of filled that one out. (Reflection log entry, Student C)

Labwork

Basic Foods, when it is offered in a traditional lab setting, has several practical components to test students' knowledge through application. Due to the on-line nature of this module, new and innovative ways had to be examined to incorporate the practical labs. Since Carbon School did not have any lab facilities other than the staffroom, it was decided that the students would prepare dishes at home under parental supervision. The students were primed for each lab with a webpage describing the lab, tips for success, basic lab procedure and recipes to use. In some cases students were given a choice of recipes while other time they were supplied with the recipe which then had to be printed from the website.

Since the parents were evaluating students, a lab assessment form was generated for each lab (Appendix H). For the first lab the assessment form was very particular with specific parameters because the target of the lab was strictly safety and sanitation. The second lab had a measuring target so parents were guided to evaluate students' measuring techniques. For all subsequent labs there was a generic portion evaluating basic lab management, time management, safety and sanitation, and measuring and preparation with a "fill-in-the-blank" section where they were directed to evaluate specific recipe techniques dependent upon the lab. For example, in Lab #3 - Pretzels, the parents were advised via e-mail to add the following points under Recipe Technique: warmed bowl and mixed dough sufficiently, kneaded dough to soft ball stage, rolled and manipulated dough to fit pan, and prepared toppings appropriately. The actual tool the parents used to complete the evaluation was a Likert scale with "needs improvement" at one end and "with distinction" at the other end. This simple scale made the evaluation process quite easy and successful for the parents. In addition to the evaluation the parent supervising the students also had to complete an "anecdotal record" that provided the parent an opportunity to write about the experience. The parents took their roles seriously and filled out each form with a lot of detail as opposed to saying "it tasted good." Although the students may have thought their parents would assist them, they didn't.

> Although our parents were assessors for the labs, they didn't help us in anyway other then financially. When it was lab time, we had to set it up - what day, what time, where, what we have, what we don't have, and we had to go down to the store ourselves. (Reflection log entry, student B)

Some of the comments the students had pertained to actually having to spend time outside of school completing schoolwork as opposed to the actual lab.

> Preparing our labs at home was effective but I would have preferred to do it in the school during class time. When we were at home we tended to get distracted and get off task easier. (Reflection log entry, student C)

The parents also used an observation record (Appendix I) to describe the product the students made and write a basic conclusion.

> The (students) prepared soft tacos for our supper this evening, and we all enjoyed them. The (students) worked together well and communicated their opinions openly about the preparation of supper. They are quite efficient with their time and made very little mess, which they cleaned up after supper. Again -- I enjoyed having the girls in my home. (Parent observation record, 06/11/97)

> I observed that the girls were neat and tidy with their hair tied back, and wearing aprons. I also observed that the girls worked well together, were very organized and kept the work area clean and tidy as they progressed with their project. Tasks were distributed equally. The girls did an excellent job of cleaning up, and the pizza was excellent. (Parent observation record, 05/05/97)

> The (students) worked well together and had fun while they worked. They had a good discussion about why they were doing what the recipe said. My measuring cups and spoons are not metric so they found a table to help them convert measurements. The girls were quite particular about accuracy and cleanliness. They cleaned up everything when they were done. I was very impressed with their attitudes. (Parent observation record, 04/22/97)

The authentic assessment model was adhered to when students prepared labs at home. The students were able to use actual equipment available in a "lived" setting. Often students prepare labs at school using specialized equipment (such as metric measuring cups and deep fryers) only to discover they don't have that equipment at home. The students were able to think about the context the lab was prepared in (even serve the dish as a meal), and apply their problem-solving skills to remedy certain situations (converting metric to imperial). Each time the students prepared a lab they did so in a different kitchen so they had the opportunity to learn how different people store equipment, clean their kitchen and store their food -- an experience not available in a school setting.

> From experience many years ago, I created foods in the lab using materials that I did not have at home (ie. Sifter). By learning this at home, they learn what materials they have available, and what compromises they may have to make in order to complete the recipe. As well, because they worked together, they still were able to experience group co-operation. (Reflection log entry, Jerilyn)

> I think that having the parents assist in lab preparation and assessment was very beneficial. Not only did the parents become involved in their child's learning, but they also got to witness some of their successes. I think that it is a terrific idea and in our situation, it worked tremendously. (Reflection log entry, Jerilyn)

Portfolios

Instead of an objective grade the students were responsible for assembling a portfolio of their work to demonstrate their progress and knowledge acquisition. Since a portfolio is a purposeful collection, parameters were set out as to the contents of the portfolio for each competency level. The portfolio for "competency with distinction" contained a lot more activities than the portfolio for "competency with recommendation." The contents of the portfolios were outlined on a webpage towards the end of the module but due to the "creating on the fly" that was used in this study the students were unaware of the contents of the portfolio until near the end of the study and the module. This created a bit of confusion and frustration as the students did not print off certain webpages such as the safety and sanitation test response sheet and the measuring test response sheet. Since they wanted to be extremely thorough the students redid the tests and then printed the response sheets. This also caused some confusion because all of a sudden I received an e-mail stating that Student A had retaken the safety and sanitation test!

The students submitted their portfolios at the end of the module to Jerilyn for assessment. Each of the students strived for the "competency with distinction" which was great considering they were battling time lines and final exams near the end of the module. The students recognized the advantages and drawbacks of the portfolio while they were working on them.

> Some benefits of preparing a portfolio for a competency mark instead of receiving a grade is that if you bombed a test really bad because you were just having one of those days, believe me it happens, it won't affect your competency mark. Some drawbacks to this is how people might just look at the answers on the worksheets, fill them out, and print them off so they are done. (Reflection log entry, Student B)

> I think it is better to make a portfolio than to get the work marked. The portfolio lets you choose the mark you want. It also gives you the chance to make sure you completed each assignment. (Reflection log entry, Student A)

> Once the students began their portfolios, they wished that they had had the criteria at the beginning so they would have been able to save assignments, etc. During the course of the project rather than simply at the end. (Reflection log entry, Jerilyn)

The use of portfolios for the purpose of assessment is a relatively new phenomenon in the education field in Alberta, especially at the junior high level. Prior to this I had only used portfolios as a meaningful collection for students to put together but I had never used them for assessment purposes or to initiate student led conferences.

E-mail Communication

One benefit to having the module on the Internet is the availability of e-mail. The students were able to e-mail me and I was able to e-mail the students and/or Jerilyn, the field researcher. Due to the distance between the students and the myself, the researcher and the subject area specialist, the e-mail was used frequently. Although the use of e-mail was relatively a new phenomenon to the students they caught on reasonably fast. They were a bit apprehensive at first but after they received their first couple of messages, replied to messages, and sent their own messages they became more comfortable. The fact that e-mail is asynchronous communication was really evident during the study. The students were in class from 2:40 p.m. to 3:20 p.m. and could e-mail at that time. Unfortunately, during those same times, I was unavailable due to prior committments, hence, I would have to respond to their e-mail messages later. Since the students did not return to the lab for two days later the message they sent had lost some of its urgency and my reply was not as important to them.

To surprise Student B and demonstrate how e-mail can seem like it is synchronous I typed a message during the morning and then set the "send queued messages" command to sent the message at 3:00 p.m. While Students B was working on the activities a dialogue box popped up on the screen signaling there was new mail. Student B immediately e-mailed back that she thought that was "totally cool."

> I think that the opportunity to use e-mail communications is a useful way of communicating because if someone was just to be our teacher and have a day job, they wouldn't be able to talk to use the phone and mailing takes longer so this way the e-mail is there fast and they can respond fast. (Reflection log entry, Student B)

> The students absolutely loved to communicate by e-mail. They thought that it was the neatest thing. They didn't mind asking questions at all, especially when they might receive their own mail. It was very exciting for them. The only downside to communicating by e-mail was not receiving an immediate answer. This was sometimes a problem which resulted in students not being able to

> complete their work (or very little) that day because they needed the answer to a certain problem. (Reflection log entry, Jerilyn)

Although using e-mail is not really anonymous it provides the student with the opportunity to ask questions without feeling embarrassed, without having to look directly at the educator, and without the possibility of someone else hearing. Towards the end of the module the students' enthusiasm was waning and tension was beginning to set in. Since e-mail protocol had been established at the beginning of the study I was able to send e-mail to student B to encourage her to continue to work hard. Student B read the appropriate message with "student B" written in the subject area and students A and C read the remaining message. By using e-mail I was able to provide some support to the students. I wasn't just the subject area specialist. The volume of e-mail we sent back and forth, some related to the study, some just personal, allowed us to establish a good working relationship during the study.

> Stick with it! It's almost done! I appreciate all the work you have done - now it is just a matter of finishing up all the assignment, tests and building your portfolio....being able to work in a group can be a difficult situation but make the best of it. Mrs. McGill understands! (E-mail message, researcher, 6/17/97)
>
> Dear Margaret, my spring break was really good! I got to visit my dad and spend some time with my mom but I did lots of shopping over the holidays (example of personal e-mail sent to researcher, student B, 4/9/97)

The use of e-mail provides another avenue for students to communicate with educators and vice versa. It provides an opportunity to ask questions that they probably wouldn't ask in school and using it provides a useful skill to students who will be entering a technological workplace.

A large number of hurdles were faced by the researcher, the classroom educator, the parents, and the students throughout this study. Several of the incidents have been discussed in this chapter in relation to the data collected and the experiences received, yet, many more remain. As we each remove ourselves from the research we surrounded ourselves in, we need to take time to contemplate the uniqueness of this research, the barriers that were overcome, and the successes we celebrated. Now I need to take the time to revisit the research questions and contemplate how the successes and failures each address constituent legs of my journey.

CHAPTER FIVE

RE-EXAMINING THE ROUTE: CRITERIA FOR SUCCESS

As our journey takes on a new focus we are beginning to enter Cuban's (cited in Swift, 1995) policy stage or third stage of his four stage adoption cycle in the Alberta educational system. School boards, governments, and teachers' associations are beginning to generate polices to regulate the use of technology in the classroom, not in an attempt to stifle these innovations but as a means of controlling the "what if" scenarios. The Internet and the World Wide Web are the two newest technologies open to global exploitation -- exploitation that could seriously affect the ideas and opinions of the youth enrolled in educational institutions in Alberta. It is this potential for exploitation that is causing many schools to refocus their energies on "how" the Internet is being used in the classroom. Although the use of the Internet is relatively limited in schools in Alberta, polices are needed to cover all possible scenarios, for today and for the future. But with the polices in place will the delivery of education through electronic means be jeopardized?

In Chapters 1 and 2, I discussed the rationale behind using technology in classrooms -- a technology that will require some educators to re-examine their pedagogical ideals of teaching and learning. The days of setting the computer up in the back of the classroom as a reward mechanism are archaic. The days of marching a class of students down to the computer lab to engage in a solitary activity under the auspices of an educator are inappropriate for contemporary curriculum. Students can thrive as life long learners by participating in an interactive world of technology. Educational needs can be addressed in schools similar to the multi-sensory, multi-activity world students are exposed to daily.

In Chapters 3 and 4, I explored the possibility of enhancing students' learning through the merging of technology and home economics/CTS. A website was created to offer FOD101 to students in Carbon School, a small, rural school in the Golden Hills Regional Division. The journey of implementation was tumultuous but rewarding. A lot of glitches were "ironed out", a lot of problems solved but the journey, although it is nearing an end for me, just scratched the surface of implementing innovative teaching and learning.

I am struggling to write this chapter. The ideas are flowing in my head but they remain single entities, ceasing to coalesce in a holistic plan. The research study I immersed myself into is coming to a close and now I have to re-examine its purpose, calculate the results, and formulate future direction. As I look back I am filled with great satisfaction -- we, (Jerilyn and I), pulled it off. Prior to the study's implementation I ran into every roadblock possible, yet, I was not going to let it deter me from attempting to equalize the disparity that exists between have and have not schools. The study itself was a lesson in patience, as more and more hurdles were placed in front of us. The doubters still doubted, yet, the proponents were becoming a larger group. With the study complete, the students satiated, Jerilyn exhausted, and myself wondering what the next step is, I have to take time to re-examine, to ideas, thoughts, recommendations, guidelines, and feelings on paper. It is now that I must take the time to revisit the questions I originally sought answers for in February.

Facilitating Choice

The ability for technology to enhance a student's learning opportunities is paramount when it is used in the classroom. Unfortunately, a huge disparity, between large and small schools, exists in the availability of technology with the small, rural schools usually being the last ones to engage in ultimate benefits. This study examined the possibility of increasing students' choices in Career and Technology Studies (CTS) through the use of technology. In this case, technology was considered a tool -- a tool students could use to equalize the disparity that exists within curricular programs. One of the questions asked in this study was "how can the Internet and the World Wide Web be used as a delivery strategy to facilitate student choice in CTS?"

As I look back at the journey we just completed at Carbon School I have to critically examine the path we took and the hurdles we chose to transverse. The successes we experienced and the problems we encountered may pave the way for other schools to engage this strategy although the obstacles they confront may be different. The use of the Internet and World Wide Web technology in the classroom is a new frontier and as the technology develops and changes, so to does its application.

The technical problems that plagued us at the beginning may have lessened our original will to succeed but they did not lessen our renewed enthusiasm when we saw the students engaging in this innovative delivery strategy. Although the resulting website, designed specifically for this study, was written for a small, rural school, serious programming changes had to be incorporated in order to keep the students excited about what appeared on their screen. I discovered very quickly, as any researcher must, that the WYSIWYG[22] principle depends on the computer used in the classroom. With no prescribed baseline for technology purchases, the variety of technology that is in the schools is vast. Although Jerilyn and the students were using an IBM machine, as I was, the design graphics that appeared on my screen were slightly different than what they saw. But it wasn't until I visited the school that these incongruencies became apparent. I knew what the website was to look like, but the students didn't -- they thought I had intentionally designed the green bar graphic to bisect the header graphic!

Learning manual HTML coding was beneficial because I was able to think about what I wanted the students to see and change the codes appropriately. Sure I could have used a Web editing program but I truly don't believe it would have provided me the same freedom to experiment by trial and error. I briefly viewed my website yesterday using the interface program Microsoft Explorer and I was dismayed, the two introductory graphics were not side by each! The whole page looked appalling. These machines were IBM but they were set up with a large resolution to enhance the viewing area for students -- another in-school setting that can seriously jeopardize the attractiveness of a website.

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[22] WYSIWYG - "What you see is what you get" A phrase heavily used in the field of word processing where formatting techniques, as they appear on the screen, are the same as those that will appear on your printer (Howe, 1997).

Another consideration in using technology to enhance a student's learning potential involves the pre-existing timetabling. With Cyberhigh and Academy On-line, students and educator work collaboratively to determine a suitable time schedule. This was not possible in Carbon because essentially the students would be studying CTS Foods in their allotted CTS Information Processing time block. To further complicate the content, students in Grades 6 to 9 were split into three classes. These classes rotated through a three day cycle with three different subjects, hence the students only had the opportunity to connect to the website every third day. This created some frustrations especially when the third day fell on a flex Friday or a holiday Monday. To exacerbate existing complications, Students A and C were together in block 3, while Student B was alone in block 2. This scenario created a few headaches as the students very seldom worked together in a group setting in the classroom. Since enrollment in Carbon School is low, the students knew each other and had no problems with group cohesiveness while completing the required labs.

Forty minutes per class was the allotted time period. Not many classes schedule a forty minute home economics/CTS class but this time period seemed to work in Carbon. The whole world of learning with technology is new and exciting and students may wish to spend a long time staring at the monitor but forty minutes is long enough for eyes to be exposed to the computer screen. Since all CTS Foods modules have a practical component to them, the forty minute time period worked well because students completed their practical assignments outside of the classroom setting.

Although Jerilyn and I had discussed the possibility of students missing other classes in order to complete this study, this option was not utilized for two reasons. The first reason was that the students were obligated to attend Health and Environmental Studies and they knew at the beginning of the study that they would have to maintain their studies in the other two courses despite the fact that they were excused from Computer Studies. Second, the other subject educators, although they knew about the study, were not directly involved hence, their concerns with completing the required curriculum in other courses escalated as the study progressed. In summary, the students were unable to secure extra time in the computer lab during their three day cycle. Students were also missing valuable Computer Studies curriculum; we justified this exclusion by approaching it not as an absense but as a chance to integrate technology and food studies. The same time the students were engaged in learning about the dangers of food poisoning they were also learning how to navigate on the Internet, how to troubleshoot computer glitches and how to complete assignments using available software programs -- objectives of the Computer Studies program.

As school boards place more emphasis on Cuban's (1995) policy stage it is important to meet the fears of the parents head-on. The unregulated atmosphere of the Internet is not being downplayed. Every day parents hear about where other students have been and the information that was been gleaned off the Internet and this causes them to dig in their heels in an effort to prevent related incidents from entering their school or their home. Any fears the parents at Carbon School may have had were circumvented at the introductory meeting with the inclusion of an Acceptable Use Policy(AUP) (Appendix J). The creation and tailoring of a school's AUP addresses the inherent fears of the parents while it places the responsibility for learning on students' shoulders. An AUP was drafted for this study as Carbon School did not have one in place. By instituting the strict adherence to an AUP for the duration of this study, the onus of responsibility was placed on individual students. If the students hypertracked during a search and came upon a website they knew was not appropriate for their learning situation, their responsibility was to remove themselves from that particular website and return to their place of origin. Even if there is an educator in the classroom allocated Internet use time, as happened in this study, it remains appropriate to maintain an active AUP for students prior to launching into cyberspace.

Throughout my engagement in this research I was evaluating the overall goals of this study in comparison to the goals of Academy On-line and Cyberhigh. Was my study really that different from the latter two?

> Be it resolved, that the effective use of technology in instruction requires:
>
> 3. Evidence that the student's learning needs are appropriately met in this way;
> 4. The potential for technology to enhance the practise of teaching and learning...
> 7. The opportunity for face-to-face contact with the teacher...
>
> (Alberta Teachers' Association, 1997, p12).

Notice the obvious difference in the delivery of FOD101 as compared to Cyberhigh -- face-to-face contact with the educator. Throughout the entire study at Carbon School, students were able to converse with Jerilyn, ask her questions, gather her opinions, and use her expertise to assist them in their lesson objectives. The delivery of FOD101 through the Internet was implemented as an enhancement to the pre-existing program as opposed to the replacement of an educator. The students were engaged in CTS modules that were not offered at school for a variety of reasons previously discussed. Jerilyn was able to handle the technical problems as well as general curricular problems. As she became more familiar with the module she was able to assist with specific assignments but she was always the first one to point the students towards the subject specialist or me for responses to their subject-related questions. The FOD101 program was vastly different from Cyberhigh or Academy On-line because of its personal interaction. FOD101's goal was not to replace educators in classrooms but to enhance students' choice in modules to make their CTS program more applicable to individual needs and wants. Offering CTS Foods via the Internet involves more than a successful delivery strategy, there is also a need to readdress the assessment methodology.

Authentic Assessment

Assessment versus evaluation -- what is the difference? For many years the terms have been used interchangeably yet, they are not the same. Assessment is ongoing, subjective, and developmental whereas evaluation is objective, means-ends, and norm-referenced. The use of the word assessment is becoming more commonplace in education circles in Alberta as educators attend assessment workshops, integrate authentic assessment strategies, and use the language in their every day dealings. But are they truly implementing the world of authentic and alternative assessment?

Regarding assessment, the question in this study included alternative assessment; that is, how can alternative assessment strategies be used to assess students' progress? With the implementation of website delivery a need for alternate assessment strategies is created. For example, is an end-of-unit test reflective of the students' growth and learning? Their learning can be marked by "taking in" worksheets and assignments, but is this activity reflective of the competencies they are developing? Finally, students can bake a cake in the staff room, but are they engaging their skills in an authentic setting? The implementation of FOD101 at Carbon School required innovative ways to assess students' learning.

CTS provides a unique opportunity for educators and students to engage in alternative assessment strategies. As a CTS educator I would prefer to return to the original intent of CTS -- competency based assessment, but I know my preference is not shared by many. The whole area of competency assessment is vague. Do you judge a student's competency based on their capability, or do you judge their competency based on the abilities of others in the class? As a professional educator and home economist, I am torn between assessing whether or not a student "can" perform the task and judging "how well" a student can perform the task. Competency based assessment remains as elusive for parents. They do not want to open up a report card to find an "S" for satisfactory on their child's report -- that is too arbitrary. They want to know how the student is doing in relation to the other students in the class. To some parents, it doesn't matter that their child is performing to the best of their ability, what matters is how far or how close their student is to the class average. Questions regarding assessment were asked numerous times throughout the duration of this study. The purpose of this study was to facilitate student choice.

At the onset of the study a decision was made that the students would not receive a grade for the work they completed. If this was to happen, all the worksheets would have to be marked, percentages calculated, and weightings assigned. This would ultimately increase Jerilyn's workload and question the purpose of placing the curricular content on the Internet. The students would be assigned three levels of competency dependent upon their personal assessment, the assessments of their parents, and the assessment of their final portfolio. The students would have the opportunity to choose the level of competency they wanted to strive for, which in turn would determine the activities they would need to complete. Unfortunately, the requirements for students' portfolios in this study weren't available until near the end due to the ongoing development on the website. The use of portfolios was a relatively new phenomenon to me as previously I had only used them to showcase a year's work for the purpose of demonstrating successes to parents. These portfolios were never used for assessment purposes; hence, I needed to re-examine my present pedagogical stance on the use of portfolios in the classroom. I discovered that portfolios can be beneficial if their content and assessment guidelines are determined collaboratively by students and educators. I discovered, when I was assessing students' portfolios, that they were really elaborate and detailed. All students put together portfolios for the "with distinction" category and they spent a lot of time assembling them. Since the portfolio requirements were not listed at the onset, students did repeat several assignments. When determining the content of the portfolio, in the future, I would provide more avenues for the students to choose their portfolio entries. For example, in this study I designated the worksheets; in the future, I would specify "one worksheet indicating your knowledge of measuring or recipe techniques." Portfolios have the potential to become useful tools in the classroom; hence, their inclusion in the website to assess student growth is paramount.

A practical lesson not included in the portfolio was the budgetting activities . Inherent in all the print CTS Foods modules is an element of budgetting for students to realize the cost of food preparation. To learn to budget is a life skill that was not adequately addressed in this study. Because students cooked at home, restricting their budget did not seem necessary; however, Jerilyn noted that a budgetting activity for each lab needs to be added to complete students' practical experiences. In a typical lab setting the students are provided with $5.00 each and as food is ordered or used from the school pantry, students are required to calculate the total cost of the ingredients used in the product. Although I relayed the budgetting information to students via e-mail, they did not complete it, nor did Jerilyn demand it be completed because she was unsure of how it fit within the study. Student B suggested that, in the future, a completed lab score sheet and budget record be imported onto the website to illustrate how to complete these forms. This procedure will be implemented in the future.

The labs were completed with a unique twist. As Carbon School did not have lab facilities, and as the completion of practical labs is paramount to learning cooking skills, students completed the labs at home -- the most authentic context providing for authentic assessment! At home the students would learn parents' standards of cleanliness and sanitation; they would learn the equipment and tools; and they would learn to demonstrate skills in a real-life setting. Although students were required to demonstrate stringent safety and sanitation regulations as outlined on the website, the actual context the students prepared food in changed with each lab. Several home economics educators couldn't understand why Jerilyn or I didn't supervise students in their home; but I felt that the process of preparing food could be assessed by parents at the introductory level. Detailed assessment tools, with simple scales, were designed for the parents, resulting in a simplified assessment process. Furthermore, on the observation records received from parents, it was noted that most of the dishes students prepared were served to family members in a meal setting -- authentic!

The key to the high level of success experienced with the parental assessment strategy is due to the high involvement parents exhibited at the school level. This same strategy may not work in another school with low parental involvement, but then again it could encourage parental involvement in an environment other than the school, which many parents find intimidating. If Jerilyn had had to assess the students, the facilities for in-school preparation would need to be available and she would require similar detailed assessment tools. However, considering Jerilyn for completing the assessment opens up another area of contention and that is subject area support. Currently, home economics educators are losing their specialization due to alternate school priorities. If school boards can hire a computer educator with 4-H clothing and textiles background or cooking ability they may choose not to hire a home economics educator. This is how a lot of home economics educators have lost their employment, a career that also keeps shrinking due to the high cost of maintaining lab facilities and equipment . By placing home economics curriculum on the Internet, several home economics educators accused me of aiding in the extirpation of our profession. I chose to approach it from a different perspective. With the specialization decreasing in numbers, the offering of FOD101 via the World Wide Web ensures that the content is specific and accurate because it was written by a home economist and a home economics educator.

Electronic Networking

The power of electronic mail (e-mail) is just beginning to surface world wide as letters are sent in minutes and asynchronous communications moves towards a more synchronous environment. Educators are often isolated in classrooms being the sole adult responsible for at least thirty students. In many small, rural schools a qualified home economics educator may be a rarity. With this aboding sense of isolation comes feelings of loneliness and the need for professional communication. E-mail can change the face of the isolation that is felt and begin to build networks of educators working together to improve professionally and personally. E-mail also has the potential to link students with educators, technicians, and other professionals in authentic settings. Students who actually ask an astronaut questions via e-mail as compared to hearing about their specialization through a lecture or an encyclopedia learn more. It was this sense of camaraderie that I wanted to build into my site by initiating e-mail communication with the question: how can an electronic support network be created to benefit the students, educators and subject specialists?

Initially e-mail communication was foreign to the students involved in the study. I began by welcoming them to the website and introducing them to the "how-to's" of the study. To encourage them to reply to the message, I asked each of them a question. This action immediately encouraged them to respond and learn the basics of e-mail communication. Following the initial introduction, students looked forward to receiving and reading mail during class. Towards the midpoint of the study, the amount of e-mail lessened because reading e-mail and responding took a great deal of time which resulted in students not accomplishing much actual module work during the allotted forty minutes of class time.

Without the benefit of e-mail, Jerilyn says that she would have given up on the study before it even began. Technical troubles were exacerbating and caused her many inconveniences. When I had initiately approached her about working collaboratively on this project I ensured her that the technical problems would be few, if any, considering the setup of the Carbon School lab. I was wrong but the e-mail assisted in alleviating the problems by ensuring a timely connection between Jerilyn and myself.

As with all Internet accounts, there is only one e-mail account. Jerilyn and the students received their e-mail via the same address; hence, a system had to be worked out to ensure a certain level of privacy. This problem was solved by using the subject line of all e-mail messages to indicate the person intending to receive the e-mail. All e-mail had to be transferred to an appropriate mailbox to retain it, thus not many confidential nor private e-mails were sent. The students kept most e-mail messages related to the content of the website. The only time this scenario changed was when I placed one of my computers in Student B's home.

In mid-May, Jerilyn and I discovered that due to technical problems, class scheduling problems, and Spring Break the students were beginning to fall behind. Group projects that required students to work together were being shelved because the students were having a difficult time finding time to prepare labs, let alone work on projects. The placing of a personal computer in one of the homes alleviated some of the timetabling problems. Although module learning was taken out of the classroom, the students completed the majority of individual work in school. It was during the time that the computer was in Student B's home that I noticed a change in the e-mail messages. Student B began to send more e-mails filled with personal questions and statements. Enhanced camaraderie was building up while Student B was learning all about e-mail. I may have received more e-mail during the month of May and June because having e-mail and the Internet at home was a rare treat and student B wanted to made use of the availability. Student B also had more questions to ask pertaining to the content of the site.

This student was the one who was on the website on Day 2 by herself. She had no one to converse with, no one to share ideas with, and no one to ask questions to because she didn't like bothering Jerilyn. The opportunity to have the computer at home provided an avenue for self-expression with the possibility of someone listening at the other end.

The presence of personal computers at home are increasing and will continue to increase until the market is saturated. Many students who learn on computers all day at school are requesting computers for home. It will only be a matter of time before the number of computers in the home equates the percentage of VCR's and microwave ovens in the homes today. An alternative solution to placing a computer in the home was given to me at Research Expo '97. A gentleman interested in the scope of my research suggested that students could approach businesses that used computers. For an exchange of service, the student(s) could use their Internet connection and their hardware on designated days for a predetermined number of hours. This support network would encourage a collaborative relationship between education and business without the business appearing as if it was prescribing the direction of education. In small, rural towns this scenario could easily work. Parents own and operate most businesses in town and most understand needs of the students. In an effort to bridge the gap between education and business, this scenario could place the resources of the business world in the hands of students.

Validity and reliability questioned

Validity, reliability, generalizability -- these are terms used in qualitative and quantitative research to indicate the value of the research in question. I personally struggled with these terms when they were first introduced to me and I still struggle with them, especially in the field of education. Each educator's journey is a personal one. Each journey begins at a different port and travels a different route. Each educator's journey has a different purpose and a different goal. Before I began my journey I had definite goals in mind. I knew where identifiable weaknesses lay in the delivery of CTS education in small, rural schools and I intended to address this situation as a means of lessening disparity present between have and have not schools.

I classified my study as a degree of action research because I wanted to become personally involved in the whole situation. I did not want to prescribe the process and then sit back and observe. I wanted to be involved with the program, with Jerilyn, with the students, and with the parents. I, personally, had a problem that required an answer, and my research would attempt to provide the answer. Although I have been plagued with the question, "your thesis needs to be written so that your study is replicable," I have a hard time justifying the replicability of action research. Even if two or more educators ask or inquire about the same question or same problem, they are viewing it from a different perspective; hence, different answers may emerge. Every attempt was made to address the issue of internal validity in this study by involving all the parties. Jerilyn, the students, and I formed a cohesive, collaborative team. We shared in the successes, we shared in the frustrations, and we shared our ideas and innovations. I was not the researcher from the university but rather the educator from nearby Linden. I was concerned with the absense of a vital CTS Foods program at Carbon School and I wanted to address the situation.

The uniqueness of this study, including the venue, makes it difficult to address external validity. It becomes hard to generalize a study that was designed with one purpose in mind, for one particular school, in one specific town in Alberta. I have made every attempt to verbalize the procedures that were followed, the programming that was completed, and the data that were gathered in an attempt to address generalizability. No other situation will generate the same results as I did, yet, the three topics I addressed (delivery strategy, alternative assessment, and electronic communications) provide a specific protocol for future study.

Reliability -- was this study reliable according to the specifics of qualitative research? There were several limitations involved in this study that would preclude its replicability.

- The small sampling of students may decrease its relevancy to other educational settings.

  The sample group consisted of three students and this causes a great deal of consternation. Although my findings are unique to this situation, they may provide opportunities for further study.

- The alternative assessment tools may not be applicable to other situations.

  Educators who are comfortable with norm referenced or means-end testing may not be able to use any of the tested tools or gathered results. As this project involved, for me, a change in pedagogical thinking regarding the purpose of testing, it becomes necessary to state that the results received may be due to my pedagogical stance. Educators not willing to address this required change may in fact receive different data or require a different focus.

- The interpretations or data analysis are subject to personal inflections and interpretations.

  As with most action research, the purpose of the study is to improve personal practise therefore the interpretations I infer from the data are influenced by my personal opinions and/or the opinions of the students, parents, and/or classroom educator. These opinions may not apply to the same study in another school.

Creswell (1994) addresses several assumptions inherent in qualitative research. These assumptions are explained using the current study:

- Qualitative research occurs in natural settings.

  This study occurred in a small, rural school; in a classroom equipped with technology; with a classroom educator as a facilitator; and a subject specialist on-line.

- The researcher is the primary instrument in the data collection.

  The establishment of the website, the technical troubleshooting, the observation of students, the creation of alternative assessment tools, the maintaining of an e-mail network -- I became a key instrument in this study and the data that was collected.

- The focus is on the participants' perceptions and experiences.

  This study focused on three students and their experiences with the FOD101 website. I needed the students' opinions, ideas, and perceptions. Their personal input was extremely important. Although all students may view the site differently, this site and subsequent study focused on a specific scenario.

- Qualitative research focuses on the process as well as the product or final outcome.

  The process of designing the website and meeting the technical challenges was paramount to this study and it was important to share these experiences. If a researcher wishes to replicate this study information needs to be included about the process as well as assessment strategies.

- Qualitative research relies on the utilization of tacit knowledge.

  This study attempted to answer several personal questions. For example I was personally involved in the study and I may not have been specific in describing certain parameters. I have made several assumptions about this study, assumptions that were applicable to Carbon School but that may not be applicable in any other situation. My expert knowledge in CTS provided me with an extensive background in module preparation -- preparation I may have been elusive about throughout this study.

This study has answered my questions; it has refocused my attention and provided food-for-thought in determining my future direction in the classroom and with this study. Although it was very specific, it has the potential to provide valuable direction for those researchers who wish to delve into the future of web-based course delivery.

Re-Examining the Research Question

Throughout this study I have kept the research question front and center. Although the creation of the website, covered in Chapter 3, was in essence a study within this study, its importance in determining the overall success of the Internet as a delivery strategy is vital. The whole idea of using technology as a "mind-tool" is new to many educators. Ideas such as constructionism and alternative assessment are equally new to many educators. It is through this study that I have come to know and understand many new concepts and it was my goal to explore new avenues for a new curriculum, to shrink the disparity between have and have not schools.

To re-examine the focus of this study let us now revisit the main question and its inherent components.

How can the Internet and the World Wide Web be used as a delivery strategy to facilitate student choice in CTS Foods?

The use of the Internet and the World Wide Web is a new phenomenon in today's classroom. Although the Internet has been used for many years, it was not until it became user-friendly with a graphical interface that it began to appear more frequently in the classroom. In order for the Internet, together with the World Wide Web, to be used as an effective delivery strategy to increase student choice in CTS, I offer the following perspectives:

- The Internet is new and its strength as a delivery strategy is just beginning to be harnessed. In order for it to be effect, most students' best interests can be used to augment the repertoire of the classroom educator, not to replace the classroom educator (e.g., What is the Problem in Chapter 2).
- Successfully integrating the use of the Internet may require educators to change their pedagogical outlook. Determining a personal comfort zone between theorys such as instructionism and constructionism can result in successful integration that involves students learning "with" technology (e.g., A Constructivist's Paradise in Chapter 3).
- It is important to address the nature of curriculum delivery using the Internet. It is not adequate to use the Internet to instruct traditionally with questions and answers. The website needs to be interactive, multi-sensory, and provide an added benefit to the students' learning (e.g., Designing the Website in Chapter 3)..

> The newest technologies must do more than present information in a glossed over package. They must allow learners the opportunity to "take control of their learning." They must take into consideration the needs of their students, allow students to "construct and reconstruct knowledge." (Jones & Schieman, 1995, p.98)

- Using technology in the classroom, especially the Internet, can be time-consuming in terms of troubleshooting technical problems. Until an industry standard is set (highly unlikely) there will continue to be hardware and software incompatibilities that may prove more frustrating then rewarding (e.g., Getting Hooked in Chapter 4)

- Using technology to deliver an option course such as CTS Foods provides opportunities for the educator to experiment with technique and methodology. With the every-present means-end testing required for core courses, the opportunity to consider the Internet as a delivery strategy may not be feasible.
- The introduction of the Internet into the classroom needs to be accompanied by appropriate policies to prevent students from travelling to undesirable sites, thus jeopardizing the Internet as an alternative delivery strategy (e.g., Acceptable Use Policy in Appendix J).
- The use of technology in the classroom to deliver curriculum can be accomplished incrementally. With the website designed and placed on a server, parts of FOD101 can now be accessed by educators worldwide. Using just the interactive safety and sanitation test may be the first step to introducing the Internet in the classroom (e.g., On-line Testing in Chapter 4).
- File Transfer Protocol (FTP) can be used to transfer files from the webserver to educators' computers. Although assessment sheets were sent via facsimile, the potential to have applicable files available for FTP is another area that needs to be explored.

How can alternative assessment strategies be used to assess students' progress?

Assessment versus evaluation -- the difference is not being noted as educators and students are encouraged to try new ways to reflect more authentic means. The opportunities abound to experiment with new means of assessing. With the whole area being relatively new in Alberta, there is a lot of area for growth and discovery. The coupling of the Internet delivery strategy with alternate assessment strategies is significant. A new technology does not usually lend itself to old assessment techniques. To successfully integrate alternative assessment strategies for the purpose of assessing students' work, I offer the following perspectives:

- Students and educators need to be continually trained in different assessment techniques in order to make them meaningful (e.g., Assessment in Chapter 4 and Authentic Assessment in Chapter 5).
- When introducing new assessment strategies it is important to introduce them in an option course area such as CTS so that parents and students become comfortable with their use.
- Using new and unique assessment tools may require pedagogical thought transformation as most tools are considered to be on opposite ends of the continuum to means-end testing.
- A variety of assessment tools and strategies are available to educators. I experimented with a number of different tools and strategies in this study to determine the best combination. Educators may choose to use just one or two of the tools used in this study (e.g., On-line Testing, Self-Assessment Rubrics and Portfolios in Chapter 4).
- On-line testing is a different phenomenon and one that the students replied they thoroughly enjoyed. To keep it applicable, continued research needs to be carried out in order to determine the capability of placing short-answer questions in the website testing repertoire.
- Due to the "exactness" required by the webserver, it is important to be sure students know the importance of spelling and grammar when engaging in on-line testing (e.g., Designing the Website in Chapter 3 and On-line Testing in Chapter 4
- The use of portfolios is a useful assessment tool but the students need to be aware of the required contents prior to engaging in a module or unit (e.g., Portfolios in Chapters 2 and 4).
- Authentic assessment needs to be grounded in authentic activity. For this study, having parents assess labwork was beneficial; in another setting an alternative strategy may be incorporated because of a lack of parental involvement or because the students do not want to work on schoolwork outside of school hours (e.g., Labwork in Chapter 4).

How can an electronic support network be created to benefit the students, educators and subject specialists?

With every new implementation in education there is a need for an accompanying avenue for discussion and dialogue. The use of the Internet in the classroom provides a great medium for communication through electronic mail. Although it is primarily used in the business world, the capability of e-mail to link educators together globally to share ideas and offer insight is significant. The world of technology can isolate educators in classrooms or it can begin to open horizons for exploration. To successfully integrate a beneficial electronic network to support the use of technology in the classroom, I offer the following perspectives:

- In order for electronic mail to be effective, ground rules need to be in place, communication needs to be applicable for a large percentage of the time, and two-way communication needs to be encouraged.
- E-mail is asynchronous and, unless both parties happen to be connected at the same time, there is a wait time involved. Answers may be delayed and problems may be corrected before an e-mail answer is received (e.g., E-mail Communication in Chapter 4).
- E-mail can provide opportunities for students to communicate with subject area specialists in order to ask subject specific questions, but the asynchronous nature of e-mail and its implications need to be assessed.
- Chat rooms, newsgroups and usenets provide an opportunity for students and educators to engage in synchronous and/or threaded communication groups. I didn't explore this avenue of communication for students because their needs were met through the e-mail components.
- In the event that more than one group of students is engaged in on-line learning at one time, the possibility of a curriculum listserv could be explored so that any questions posted by the students and answered by the subject area specialist could be seen by all.

- The need to have a technician close at hand or available every day was vital in this study. As I was "breaking new ground" in my quest to facilitate choice, I communicated extensively with Dann St. Pierre.

The Research Question

To reiterate the research question that guided this study:

> **How will the use of Internet technology facilitate student choice in CTS: Foods modules through the provision of an electronic delivery and support network for the educator and the student(s)?**

Internet technology has the capability to equalize the disparity that is occurring in schools across Alberta. In schools with adequate resources and facilities, the new CTS curriculum provides more opportunities for expanding the curriculum and consequently increasing student choice. In schools without facilities or resources, the new CTS curriculum can be limiting because the choice of modules available to students is reduced. The Internet can provide an opportunity to change this situation by offering specific curriculum through electronic means. With the majority of schools in Alberta "hooked up" to the Internet it is paramount that websites designed for educational delivery are unique, engaging, interactive, and designed with students' interests at heart. Using the Internet to deliver curriculum requires the building of a network for the students and educators, as well as exploring alternative assessment techniques.

The whole environment of the Internet and the World Wide Web and its potential use in our classroom is a different field that will require more research in order to capture its full capability. I leave this chapter knowing I have just scratched the surface of this new educational tool and strategy.

CHAPTER SIX

RETURNING TO THE POINT OF DEPARTURE: FUTURE DIRECTIONS

As I begin to plan my return to the classroom, I find myself reflecting on the past year's journey -- a journey that: took me to places I never thought I would explore; encouraged me to continually ask for directions; had a personal and professional goal in mind; assisted in decreasing the disparity between rural and urban schools; and allowed me the opportunity to form new liaisons and lasting friendships.

Thinking back to the hurdles that plagued my initial start-up I cannot help but express my thanks to those who doubted me. Their doubt engrained in me a persistence to succeed and a will to continue despite the hurdles that were placed in front of me. Numerous barricades were surmounted, new paths were blazoned, and new ideas experimented with throughout this study. This journey proved personally difficult, yet, rewarding and I wish to revisit it in an attempt to reconceptualize and redesign. While boring journeys are never replayed, just filed away in a photographic memory -- my journey has just begun!

Throughout the study I have come to terms with how my past pedagogical stance was developed and I have made a committment to continue to build my present pedagogical vision that places the student at the centre of my teaching universe. Through this study I discovered the terms instructionism and constructionism, and decided to carve a place for myself in the middle comfort zone. I cannot begin to throw away all of the past; the change process for me needs to be gradual and conclusive so that I do not return to the old and original.

My love of technology, although taxed at certain moments during the study, has continued to grow and flourish. I will continue to encourage fellow educators to embrace the use of technology in classrooms but, I am the first to caution them that technology invites us to consider old ways and encourages us to adopt new visions. Many educators will not want to change initially but even a small step is a first step.

Technology has a definite place in education; it will continue to influence the lives of our students; it must be considered a tool and not a panacea; and it is here to stay. As technology has progressed from drill-and-practise to the more sophisticated multimedia and hypermedia, education has been slow to embrace technology's inception. This lack of adoption is not necessarily due to lack of enthusiasm but more a lack of funds. No sooner do schools equip themselves with upgraded hardware and software then all is obsolete. The technical world, in its haste to invent better and faster, does not consider the disadvantages imposed on the education field. Yet, it seems as if bigger and better is the way to go if schools have any intention of preparing students for the next millennium.

Even the Internet plays a role in this "bigger is better" phenomenon. A few years ago a 14.4 baud modem was considered fast, now ADSL lines and Internet via cable television are the "wave" of the future. Another opportunity for technology to leave schools in the dust. What is needed is more people designing software and websites for education; that is, education of the masses, not the lucky few with the latest technological paraphernalia. If I think back to my first computer I had during my first year of teaching I am amazed at how far I have progressed. I am also aware of how far I have to go in order to converse with the most up-to-date technology. In addition I am aware of how much I have yet, to learn about my antiquated system.

As schools' budgets decrease and parents demand more concrete proof of advantages, technology may be allotted a decreased place in the school curriculum. I, personally, cannot let this happen. This study proved to me the power technology has to equalize the disparity between have and have not schools. Although I am but a "single drop in the bucket" every journey must begin with a first step.

Throughout this study I have not lost sight of my original goal -- to use technology to increase student choice in CTS Foods in Carbon, Alberta. Although this goal was very specific, the tools and implementation strategies can be used as a starting point for other educators wishing to begin their exploration. In the beginning I struggled with the original intent of my question. This was an implementation study but the integration of technology into the curriculum as a delivery strategy involved more than a "can it be done" inquiry. Yes, it can be done, but in order for it to be done successfully, educators can examine and design new theories and new techniques, especially in the area of assessment. The whole area of alternative assessment is just beginning to blossom in Alberta and I just scratched the surface with self-assessment rubrics, on-line testing, and portfolios. I feel that the assessment strategies that were included in this study have potential to change the face of assessment as we presently know it. Educators, in general, are the last to embrace alternative assessment strategies, especially strategies that place the onus of responsibility and accountability on shoulders of students. Many educators feel that students assessing themselves is wrong -- that students will always: assess high, treat it as a joke, and not be fair when peer judging. How valid is self-assessment when compared to a means-end test? I have explored the area of assessment and tried the many models. I have assessed students on effort and attitude and not just subject content. I have discovered that students have higher expectations of themselves than educators and they are very fair and objective when marking peers. Students can assess their own personal growth and since this is a skill they will use in the work world it is important that they learn how to do it now.

Where does this study lead now that it is complete? The school I am returning to has a viable CTS foods program with an equipped CTS foods lab. I cannot justify offering any of my modules using the Internet because the Internet connections are contained in the computer lab, not the CTS classroom. But that does not preclude the continued offering of CTS modules to Carbon students under the auspices of the program offered in Linden. This is probably one activity I will delve into when I return to active duty -- the offering of "distance education" CTS modules to Carbon School. A practise such as this would increase student choice, build the current program at my school, offer the expertise of a subject specialist on-line, and integrate the Internet into a currently existing program. Perhaps the program could even expand to include fashion, construction technologies, communication studies, or photography. The only challenge would be for the students to arrive at an authentic setting to use for their practical projects -- the local garage, the local newspaper, the home based seamstress... the list is endless.

Although I cannot offer an Internet based CTS module to any of my students, it does not prevent me from using components of my website. Just recently I had a Grade 8 student complete her safety and sanitation test on the web because she was the only student registered in Food Basics. I did not have time to photocopy any paper tests and it was more meaningful for her to complete the test using the website. She was also able to get her mark back instantaneously without more paperwork. When the Grade 7's begin CTS next semester, I will use the on-line testing and the on-line measuring demonstration. The testing will reduce the amount of paperwork and the on-line demonstration will ensure consistency in the content covered by allowing the students the opportunity to review the information at any time.

The whole area of assessment opened new doors to my prior ways of thinking. I have incorporated elements of alternative assessment strategies in all my courses. I have implemented the use of self-assessment rubrics after major assignments in Science. I have incorporated portfolio construction in CTS and Science -- students must prepare a "best work" portfolio as a tool to assess personal growth. Students must take home their portfolios and share the contents with their parents, who will, in turn, complete a reflection log indicating what areas they feel their students grew in. Students are able to contract for individual marks in Science based on pre-determined criteria. Textbooks are no longer part of the students' learning "kit," instead I provide notes and discussion for students in order to encourage them to develop and fine tune critical thinking skills. I am encouraging students to look at alternatives to the traditional term paper such as webpage publishing. E-mail communications among educator, student, and parent is encouraged. A class homepage is being produced with relevant information, expectations, project outlines, homework requirements, handbook contents, and relevant hot links related to science and technology. I am also attempting, with the purchase of additional hardware, to bring technology to students by downloading relevant websites and information pertinent to the subject being studied. I want to strike that balance I mentioned earlier, a balance between instructionism constructionism.

Where does this study leave Carbon School? Jerilyn is already using the FOD101 site for a special education student to learn about Food Basics. Although only parts of the site will be used, the content of the module will be studied by the student and some of the assessment tools will be implemented. Student A continues wait anxiously for a fashion module and one of the parents who participated in the study recently inquired about other foods modules that may become available. The need is apparent, students' voices have been heard, and now my goal will be to continue to develop websites for use at Carbon School. At the present moment, FOD101 is available globally and this is another issue that will have to be addressed. As the time I have available for designing websites is quickly depleting, I must inquire about mandatory login with Dann about codes, restricted access, and passwords.

I will continue to control the path this study will continue on but I have questions that prevail. Will this study continue to equalize the disparity between urban and rural schools? As CTS becomes commonplace in the Alberta curriculum, will programs become set and new modules extinct? Will this study pave the way for future on-line courses through Cyberhigh and Academy On-line that are more interactive and student controlled? One thing is certain -- as technology changes, so to will the tools I have available for integration change into the website. This present website was designed with the lowest common denominator in mind -- the lowest configuration of technology a rural school could have to incorporate the Internet. Perhaps an education/industry standard will be dictated and the lowest common denominator will include mpeg movies and real-time communication. The future has yet, to be written.

In conclusion, the full capability of the Internet's influence on education has yet to be determined. My study provided substantial impetus for those wishing to use the Internet in the classroom, but it only provides a guideline, an idea, and some food for thought. I will end with the following quotations confirming my previous ideas and thoughts:

> It is important to design student-centered curricular which is rich in technology to provide students with the skills they need to survive and succeed in the new millennium (Quesada, 1995).
>
> I found this course very informative. It taught me about safety and sanitation which can come in handy when preparing food. I also learned a lot about the Internet. I would recommend this module to anyone interested with taking a home economics course in smaller schools (Reflection log entry, Student A).

Thank you so much for your time, attention, and opportunity you gave the (students). It will be a rewarding experience they will always remember in a positive manner! (Reflection log entry, parent)

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Appendix A

January 30, 1997

Ms. Kathy Smith, Chairman of the Board
Golden Hills Regional Division #15
435A Highway #1
Strathmore, AB

Dear Ms. Smith:

I am writing to you to request your permission to carry out research at the Carbon School for my Master's thesis. The question I am studying is:

How will the use of Internet technology facilitate student choice in CTS: Foods/Fashion modules through the provision of an eletronic support network for the teacher and the student(s)?

The key components of the question include:

- alternative assessment strategies
- facilitating student choice in CTS through electronic delivery
- providing an electronic support network

This study, upon your approval, will be conducted from February 17 to April 30, 1997 with an extension to May 31, 1997 if required. I will be designing two CTS modules: FOD101 and FAS103 for electronic delivery using the Internet and World Wide Web. These modules will be inclusive with built-in strategies for practical component delivery and networking. The predesigned website, that a group a 3-4 Grade 6,7 or 8 students will access, will supply the necessary components for module completion. I will be using a variety of alternative assessment techniques including peer marking, self asssessment, self reflection, effort and attitude rubics, and parent and teacher checklists. An electronic communication system will be set up so students can respond to embedded questions, worksheets, responses initiated by the researcher and general enquiries as to problems and questions. This communication network will be encouraged and facilitated through the primary investigator (myself) and the field researcher (Jerilyn McGill).

I feel this research is necessary and timely due to the impending implementation of CTS in Alberta schools. The modularization of the proposed program and its ability to be offered over the Internet has the potential to increase student choice and provide a network for the classroom teacher who may or may not have the necessary subject content background. I am especially interested in small, rural schools, such as Carbon, where the student initiative for CTS is present but the resources may be insufficient to offer a range of strands and modules.

Appendix A

A parent/student meeting will be scheduled during the week of February 17-21, 1997 to inform parents of this research and seek their consent and their child's consent. If the interest level is greater than the 3-4 students needed for the study then a committee consisting of Gerilyn Miller, Dave Stewart, and myself will choose the student group based on the student's present achievement, motivation level and potential self-benefit.

All ethical considerations will be adhered to as outlined by the Department of Secondary Education at the University of Alberta. Students and/or parents will have the right to opt out of the study at any time. Anonymity will be guaranteed in published or presented material. Upon consent, the division and the school will be identified. All research findins will be available to the school board upon completion of the research if desired.

The general methodology of the research will focus around action research therefore, I will be very involved in the project in the classroom and through the electronic network. Mr. Dann St.Pierre has agreed to act as the technical advisor for the duration of the research to ensure no debilitating technical problems occur.

At the same time the students are working with this research through the modules, they will be gaining valuable experience working with the Internet responsibly. If Carbon School does not have an Acceptable Use Policy, one will be designed for the participants, parents and staff to sign. This will ensure students do not abuse the privileges granted to them through unlimited Internet access.

If you have concerns or questions regarding this request for consent of entry please feel free to contact my superivor, Dr. Maryanne Doherty-Poirier at (403) 492-5769 or myself at (403) 492-5210.

All results and findings will be available to the school board upon completion of the research.

Sincerely,

Margaret Stambuski-Dart

Encl.

Appendix A

CONSENT FORM: INTERNET AND CTS STUDY (1997)

I hereby grant permission to Margaret Stambuski-Dart to carry out research at the Carbon School from February 17 to April 30, 1997 with a possible extension to May 31, 1997.

This permission is granted provided:

- ethical considerations have been meet
- parental and student consent be secured prior to beginning research
- anonymity will be guaranteed
- names of participants will not be used in the thesis or subsequent publications or presentations
- Golden Hills Regional Division #15 and Carbon School will be acknowledged in all print material
- copies of the research will be available to the School Division if desired

Chairman of the Board	Date
Researcher	Date

Appendix A

January 30, 1997

Dr. Garry McKinnon, Superintendent
Golden Hills Regional Division #15
435A Highway #1
Strathmore, AB

Dear Dr. McKinnon:

I am writing to you to request your permission to carry out research at the Carbon School for my Master's thesis. The question I am studying is:

How will the use of Internet technology facilitate student choice in CTS: Foods/Fashion modules through the provision of an eletronic support network for the teacher and the student(s)?

The key components of the question include:

- alternative assessment strategies
- facilitating student choice in CTS through electronic delivery
- providing an electronic support network

This study, upon your approval, will be conducted from February 17 to April 30, 1997 with an extension to May 31, 1997 if required. I will be designing two CTS modules: FOD101 and FAS103 for electronic delivery using the Internet and World Wide Web. These modules will be inclusive with built-in strategies for practical component delivery and networking. The predesigned website, that a group a 3-4 Grade 6,7 or 8 students will access, will supply the necessary components for module completion. I will be using a variety of alternative assessment techniques including peer marking, self asssessment, self reflection, effort and attitude rubics, and parent and teacher checklists. An electronic communication system will be set up so students can respond to embedded questions, worksheets, responses initiated by the researcher and general enquiries as to problems and questions. This communication network will be encouraged and facilitated through the primary investigator (myself) and the field researcher (Jerilyn McGill).

I feel this research is necessary and timely due to the impending implementation of CTS in Alberta schools. The modularization of the proposed program and its ability to be offered over the Internet has the potential to increase student choice and provide a network for the classroom teacher who may or may not have the necessary subject content background. I am especially interested in small, rural schools, such as Carbon, where the student initiative for CTS is present but the resources may be insufficient to offer a range of strands and modules.

A parent/student meeting will be scheduled during the week of February 17-21, 1997 to inform parents of this research and seek their consent and their child's consent. If the interest level is greater than the 3-4 students needed for the study then a committee consisting of Gerilyn Miller, Dave Stewart, and myself will choose the student group based on the student's present achievement, motivation level and potential self-benefit.

All ethical considerations will be adhered to as outlined by the Department of Secondary Education at the University of Alberta. Students and/or parents will have the right to opt out of the study at any time. Anonymity will be guaranteed in published or presented material. Upon consent, the division and the school will be identified. All research findins will be available to the school board upon completion of the research if desired.

The general methodology of the research will focus around action research therefore, I will be very involved in the project in the classroom and through the electronic network. Mr. Dann St.Pierre has agreed to act as the technical advisor for the duration of the research to ensure no debilitating technical problems occur.

At the same time the students are working with this research through the modules, they will be gaining valuable experience working with the Internet responsibly. If Carbon School does not have an Acceptable Use Policy, one will be designed for the participants, parents and staff to sign. This will ensure students do not abuse the privileges granted to them through unlimited Internet access.

If you have concerns or questions regarding this request for consent of entry please feel free to contact my superivor, Dr. Maryanne Doherty-Poirier at (403) 492-5769 or myself at (403) 492-5210.

All results and findings will be available to the school board upon completion of the research.

Sincerely,

Margaret Stambuski-Dart

Encl.

Appendix A

CONSENT FORM: INTERNET AND CTS STUDY (1997)

I hereby grant permission to Margaret Stambuski-Dart to carry out research at the Carbon School from February 17 to April 30, 1997 with a possible extension to May 31, 1997.

This permission is granted provided:

- ethical considerations have been meet
- parental and student consent be secured prior to beginning research
- anonymity will be guaranteed
- names of participants will not be used in the thesis or subsequent publications or presentations
- Golden Hills Regional Division #15 and Carbon School will be acknowledged in all print material
- copies of the research will be available to the School Division if desired

____________________	____________________
Superintendent	Date
____________________	____________________
Researcher	Date

Appendix A

January 30, 1997

Mr. Dave Stewart
Principal
Carbon School
Carbon, AB

Dear Mr. Stewart:

I am writing to you to request your permission to carry out research at the Carbon School for my Master's thesis. The question I am studying is:

How will the use of Internet technology facilitate student choice in CTS: Foods/Fashion modules through the provision of an eletronic support network for the teacher and the student(s)?

The key components of the question include:

- alternative assessment strategies
- facilitating student choice in CTS through electronic delivery
- providing an electronic support network

This study, upon your approval, will be carried from February 17 to April 30, 1997 with an extension to May 31, 1997 if required. I will be designing two CTS modules: FOD101 and FAS103 for electronic delivery using the Internet and World Wide Web. This modules will be inclusive with built in strategies for practical component delivery and networking. The predesigned website, that a group a 3-4 Grade 6,7 or 8 students will access, will supply them with the necessary components for module completion. I will be using a variety of alternative assessment techniques including peer marking, self asssessment, self reflection, effort and attitude rubics, and parental and teacher checklists. An electronic communication system will be set up so the students can respond to embedded questions, worksheets, responses initiated by the researcher and general enquiries as to problems and questions. This communication network will be encouraged and facilitated through e-mail connections to myself.

I feel this research will directly benefit your school as the modularization and delivery of these modules will offer your students and staff more program choice. With the increased desirability of life-long learning and problem solving skills in our youth, the opportunity for electronic delivery may increase the student's personal responsibility for their learning. This method of delivery is not being designed to replace the classroom teacher but rather to augment their repertoire of choice in designing their program.

Appendix A

Following your consent, I will schedule a information parent/student meeting during the week of February 17-21, 1997 to inform parents of this research and seek their consent and their child's consent. If the interest level is greater than the 3-4 students needed for the study then a committee consisting of yourself, Jerilyn McGill, and myself will choose the student group based on the student's present achievement, motivation level, and potential self-benefit.

All ethical considerations will be adhered to. Students and/or parents will have the right to opt out of the study at any time. Anonymity will be guaranteed in the thesis and subsequent publications or presentations. Upon consent the school will be identified.

The general methodology of the research will focus around action research therefore, I will be very involved in the project in the classroom and through the electronic network. My presence in the class, working with this group of students, will not interfere with preplanned lessons or discipline. Through my conversations with Jerilyn McGill, she has agreed to be a field researcher to monitor student behaviour and work ethic when the students are working on the modules. She may also be responsible for experimenting with some of the assessment tools which will be tried during the research. With your permission, Mr. Dann St.Pierre has agreed to act as the technical advisor for the duration of the research to ensure no debilitating technical problems occur.

At the same time the students are participating in this research through the modules, they will be gaining valuable experience working with the Internet responsibly. If your school does not have an Acceptable Use Policy, one will be designed for the participants, parents and staff to sign. This will ensure students do not abuse the privileges granted to them through unlimited Internet access.

If you have concerns or questions regarding this request for entry please feel free to contact my superivor, Dr. Maryanne Doherty-Poirier at (403) 492-5769 or myself at (403) 492-5210.

Sincerely,

Margaret Stambuski-Dart

Encl.

Appendix A

CONSENT FORM: INTERNET AND CTS STUDY (1997)

I hereby grant permission to Margaret Stambuski-Dart to carry out research at the Carbon School from February 17 to April 30, 1997 with a possible extension to May 31, 1997.

This permission is granted provided:

- ethical considerations have been meet
- students and parents will be duly informed through a meeting
- parental and student consent be secured prior to beginning research
- regular classroom activities will not be disrupted
- prior arrangement for class visitations will be secured
- opt out privileges will be secured for students and staff
- the work load of the classroom teacher is not increased
- anonymity will be guaranteed
- names of participants will not be used in the thesis or subsequent publications or presentations
- Carbon School will be acknowledged in all print material
- copy of the research or research findings will be provided to the school if desired

Principal	Date
Teacher	Date
Researcher	Date

Appendix B

Dear Parents and Students:

My name is Margaret Stambuski-Dart and I am a teacher employed by the Golden Hills Regional Divison but presently on sabbatical studying at the University of Alberta.

One of my goals this year is to design a research question, collect data and write a thesis of my findings. Since I am extremely interested in the new Career and Technology Studies program and the use of the Internet, I would like the opportunity to conduct my research in the Carbon School with a group of 3-4 Grade 6,7, or 8 students.

My research question is:

How will the use of Internet technology facilitate student choice in CTS: Foods/Fashion modules through the provision of an eletronic support network for the teacher and the student(s)?

I will be studying the following parameters:

- Setting up a web page to offer Food Basic and Ready, Set, Sew!
- Designing course content, worksheets and readings
- Selecting a variety of assessment tools
- Inviting parental collaboration with student project completion
- Encouraging electronic two way communication

This study will be carried from February 17 to April 30, 1997 with an extension to May 31, 1997 if required. I will be using a variety of alternative assessment techniques including peer marking, self asssessment, self reflection, effort and attitude rubics, and parental and teacher checklists. An electronic communication system will be set up so the students can respond to embedded questions, worksheets, responses initiated by the researcher and general enquiries as to problems and questions. This communication network will be encouraged and facilitated through e-mail connections to myself.

The purpose of this study is to increase student choice in the regular classroom through electronic delivery. With the increased desirability of life-long learning and problem solving skills in our youth, the opportunity for electronic delivery may increase the student's personal responsibility for their learning. This method of delivery is not being designed to replace the classroom teacher but rather to augment their repertoire of choice in designing their program.

Appendix B

The students selected to participate in this study will attend regular CTS classes as scheduled by the school except that they will engage in modular work via the Internet. It is important that both parent and student agree to participate in this research due to the practical lab components of the module. Students will have to complete cooking and sewing assignments, including assessment, at home under parental supervision.

An informational parent/student meeting has been scheduled for February 19, 1997 at 7:00 p.m. (in the Carbon School) to provide you with more details, answer any questions you may have, demonstrate the initial website and seek participants. Mrs. Jerilyn McGill has agreed to act as the field researcher for this study and Mr. Dann St-Pierre will act as the technical advisor.

If you have any questions please feel free to contact my University supervisor, Dr. Maryanne Doherty-Poirier at (403) 492-5769 or myself at (403) 492-5210.

Sincerely,

Margaret Stambuski-Dart

Appendix C

Agenda
CTS/WWW Study

February 20, 1997
1900 hours

1) Introduction
   - Who am I?
   - Education purpose

2) Degree Requirements
   - Thesis bases
   - Research project

3) CTS/Home Ec
   - What is it?
   - Why important
   - Elements
     - competency based
     - integrating technology
     - student choice - 849 modules; limitations

4) Home Ec and Technology
   - Last to be associated
   - First to integrate

5) Purpose
   - Combine CTS/Home Ec/Technology

6) Research Question

7) Explain Research
   - Practical project
   - Usuable
   - Action research
     - in the classroom
     - improvement of practise

8) Future
   - Chinook's Edge
   - Cyberhigh

9) How mine is different
  - Teacher and parents are key players
  - Assessment practises
  - Not replacing classroom teacher but augmenting their repetoire

10) Ethics of project
  - School and RD recognized
  - Student Anonymity
  - Opt out

11) Timetabling

12) Concerns
  - Internet
    AUP
    no searching
    e-mail and marking
  - Connections
    connect time
    ISP and down time

13) Parent
  - Practical lab assessment
  - Time on task at home
  - Diary of Experienced
    benefits and limitations

14) Publishing Results
  - Executive report acknowledging students' contribution

15) Questions

16) Demonstrate Website

17) Consent Forms

18) Adjournment

Appendix D

Date: February 20, 1997

Research Project: Internet & CTS: Facilitating Student Choice

Primary Researcher: Margaret Stambuski-Dart, University of Alberta

Research Location: Carbon School, Golden Hills Regional Division #15

Why is this research project important?

Technology is a part of our everyday lives. As parents and teachers we need to provide our children and students with the skills necessary to envelop technological skills through integration. Technology is no longer a 'subject' but rather a methodology of instruction. The use of the Internet with the World Wide Web provides an opportunity to students unprecented since the invention of the printing press. This technology will open a whole world to students and remove the walls surrounding them. The opportunity to increase a student's subject choice has the potential to increase when the Internet is used as a delivery tool. This study will explore the possibility and feasibility of incorporating Career and Technology Studies (CTS): Foods and Fashion modules with Internet delivery.

Why should we participate?

Our child will receive receive the following benefits:

- the opportunity to study Foods (FOD101) and Fashion (FAS103)
- the opportunity to acquire technical skills involving the use the Internet, e-mail and the World Wide Web
- the opportunity to provide input into the design of the CTS: Foods and Fashion template for web pages

How may participation inconvenience us?

Due to the lack of sewing and food preparation facilities at Carbon School, certain required components of the modules will have to be completed at home using a variety of assessment techniques. As a parent I understand that I may be required to supervise and/or assist in assessment of process and product during these tasks. As a student I understand that I may be required to complete some activities at home under the tutelage of my parent and complete a variety of alternative assessment techniques.

Appendix D

What will be our responsibilities?

As a student you will be responsible for:

- logging onto the website and completing required assignment and projects
- participating in the use of a variety of assessment tools such as self-reflection, peer assessment, portfolio, rubics and checklists
- corresponding via e-mail with the primary researcher
- maintaining a diary of events and opinions throughout the research
- engaging in self-reflection
- completion of all practical activities at alternative sites
- maintaining a conscientious and responsible attitude

As a parent you will be responsible for:

- assisting my child with the completion of practical lab components
- participating in alternative assessment techniques such as checklists and rubics
- maintaining a diary of events and opinions throughout the research

May we withdraw at any time?

Participants in the study are granted the option to withdraw their participation at any time, no questions asked. We understand that if one of us withdraws than the other will be obligated to withdraw as well.

How will anonymity be guaranteed?

All names identifying any participant will be 'whited out' from all correspondance, worksheets, projects, diaries and e-mail communication. Students may be assigned a pseudonym for the duration of the project. We understand the school and the division will be identified in the research.

How will the results of the study be reported?

All findings from this research study will be compiled into a thesis in partial fulfillment for the primary researcher's Master's of Education Degree. Results and findings may be used in further studies and presentations. We may receive a copy of the completed findings if we request it.

Appendix D

PARENTAL CONSENT FORM FOR PARTICIPATION

I have received and clearly understood the following parameters of this research study:
(Please check all that apply)

- ☐ **the purpose of the project**
- ☐ **the acceptable use policy to be used**
- ☐ **my role as a collaborative partner**
- ☐ **alternative assessment technique being utilized**
- ☐ **the role of the Internet, World Wide Web and e-mail in the project**
- ☐ **the role of the primary researcher**
- ☐ **the role of the field researcher (classroom teacher)**
- ☐ **expectations of myself**
- ☐ **expectations of my child**
- ☐ **the school scheduling for maximum participation (health, enviro, computer)**
- ☐ **practical lab component completion**
- ☐ **why action research is the chosen inquiry method**
- ☐ **the anonymity and confidentially guaranteed to my child and myself**
- ☐ **the need for securing all e-mail, opinions, reflections and assessments for study purposes**
- ☐ **the recognition of Carbon School and Golden Hills R.D.#15 in all documents**
- ☐ **the option for my child or myself to opt out of the study at any time**
- ☐ **the option for the primary researcher, field researcher and principal to terminate my child's participation in the study at any time**

Appendix D

We have read and understood the information supplied to us.

I herby agree to participate in this study as a collaborative team member along with my child, for whom I grant permission for participation.

Child's name: ______________________________

Parent's name: ______________________________

Parent's signature: ______________________________

Date: ______________________________

CONTACT INFORMATION:

Margaret Stambuski-Dart	**Box 204 Linden, AB T0M 1J0**	**#5 - 341 Education South University of Alberta Edmonton, AB T6G 2G5**
Phone	**(403) 546-4476**	**(403) 492-5210 (403) 430-1216**
Fax	**(403) 546-4476**	**(403) 492-9402**
Dr. Maryanne Doherty-Poirier		**440 Education South**
Phone		**(403) 492-5769**

Appendix E

Food Safety Pamphlet Assessment Rubic

Objective	WGT	Distinction (2 points)	Recommendation (1 point)	Incomplete (0 points)
1. Group Participant contributes to team as an equal member; respects other members opinions and ideas.	x 2	student actively participates and contributes to group mechanics	student restricts group participation to limited exposure; limited contribution to group	student does not contribute to group mechanics in a positive manner
2. Self Directed Learner identifies and utilizes a variety of resources for chosen research topic	x 2	student uses at least 2 print resources and an indepth search on the Internet	student uses only 1 print resource and checks the Internet superficially	student relies on personal facts only; no additional resources used
3. Critical Thinking chooses relevent factual information appropriate for scope of project	x 1	student includes a minimum of 15 researched facts in a variety of subsections.	student includes a minimum of 10 research facts in a variety of subsections	student includes a minimum of 5 facts in no identified subsections
4. Knowledge Acquisition identifies and discusses information with degree of personal competence	x 1	student converses with ease about information on pamphlet without prop	student is able to explain facts on pamphlets with limited reference to prop	student not able to to explain any facts on the pamphlet without reference to prop
5. Creative/Quality Output uses imagination and creativity to produce project reflective of personal/group capabilities	x 1	pamphlet is well organized displaying superb creativity and imagination in layout, information portrayal and medium used	pamphlet is complete; limited expression of creativity and imagation in layout. Student relies on traditional methods of expression and medium	pamphlet is incomplete; limited creativity; no personal imagination; layout is haphazard and careless.
6. Reflective Learner identifies with the information acquired as forming a basis for future personal use in Food Studies career	x 2	student recognizes the importance of the information researched as forming a basis for accuracy and safety in their Food Studies career	student is able to form link between information learned and Food Studies module only; no personal application	Student not able to visualize linkages between information researched and practical applications.
		13-18 points	7-12 points	0-6 points

Personal Information

Name

Date

Group Members

Comments

Overall Assessment

Distinction ☐
Recommendation ☐
Incomplete ☐

Appendix F

Self Evaluation * My Healthy Eating Knowledge

Directions: Circle the response that most accurately describes your reaction to each statement below.
1=strongly agree 2=agree 3=neutral 4=disagree 5=strongly disagree

1. The 24 hour dietary recall provided an opportunity to reflect on my eating habits
1 2 3 4 5

2. Foodfocus 3.1 presented my dietary intake in a graphic and illustrative manner
1 2 3 4 5

3. Through the dietary recall and Foodfocus 3.1 I was able to determine if my diet was adequate for a teenager.
1 2 3 4 5

4. Foodfocus 3.1 is an easy and effective program to learn.
1 2 3 4 5

5. The assignment "What's In It For Me?" provided an opportunity for me to make wise choices.
1 2 3 4 5

6. Overall, I have gained further personal insight into "healthy eating" and my dietary needs.
1 2 3 4 5

Additional Comments: (provide personal comments and ideas)

Appendix G

Student Self- and Peer Evaluation Form

This form will be used to assess the members of your learning group.

√ Fill one form out on yourself.

√ Fill one form out on each member of your group.

√ With the classroom teacher and group members present arrange a group discussion time.

√ During the discussion time, give each member the form you have filled out on them. Compare the way you rated yourself with the ways your groupmates have rated you. It is important to discuss all components of the rating scale - ask for clarification for all parameters, ask questions and provide insight to your group members.

√ Your rating scale may differ from the way your group members rate you - do not take this personally - learn from the experience. The goal of this rating scale is to provide an opportunity for you to grow.

Person being rated:

Write the number of points earned by the group member:
(4-excellent, 3-good,2-fair, 1-poor)

Computer work:
______ contributed equally to all work
______ reliably completed all assignments
______ work consistently of high quality
______ completed individual work when required
______ concentrated on required work
______ contributed to all group work
______ didn't waste group time
______ worked constructively at all times while on-line
______ able to work outside school time willingly

Lab work:
______ equally shared all required duties
______ contributed to group's success
______ built on lab with previous experience
______ consistently worked with regard to safety and sanitation
______ enhanced measuring and preparation skills at all times
______ didn't waste time in the kitchen
______ followed all directions and enhanced group cohesiveness
______ completed necessary paperwork after practical lab
______ voluntarily spent extra time completing labs

Appendix H

Lab #1 Checklist
Target: Safety & Sanitation

Group Members: ______________________________
Date: ______________________________
Evaluator: ______________________________

NI - needs improvement
WD - with distinction

Basic Lab Management:

Recipe is written out with adjustments NI ●————● WD
Cursory check of foodstuffs completed ●————●
Groceries have been purchased ●————●
Care and consideration given to yield ●————●

Time Management:

Group members prepared for lab NI ●————● WD
Efficient use of time utilized throughout lab ●————●
Students move through kitchen efficiently ●————●
Duties equally divided ●————●
Effectively follows recipe ●————●

Safety and Sanitation:

Personal hygiene: hands washed NI ●————● WD
hair tied back ●————●

Personal safety: proper attire NI ●————● WD
clean aprons ●————●
practises safe kitchen protocal as ind. ●————●

Group safety: no running or horseplay NI ●————● WD
handling equipment safely ●————●
practises safe kitchen protocal ●————●

Sanitation: handles food in safe manner NI ●————● WD
"clean as you go" ●————●
hot, soapy water used ●————●
surfaces cleaned & sanitized ●————●
use of kitchen sanitation practises ●————●
returns facility to sanitary standard ●————●

Appendix I

Observational Record - Parent

Date: ______________________________________

Class: ______________________________________

Participants: ______________________________________

Setting: ______________________________________

Components of description: (setting, description of what you saw, description of what you heard, interpretation of incident, your opinions and ideas, nonverbal and verbal cues, group dynamics, feelings & beliefs about what you observed)

Appendix J

INTERNET AND ELECTRONIC MAIL PERMISSION FORM

We are pleased to offer students at the Carbon School access to the school network system for electronic mail and the Internet. To gain access to e-mail and the Internet, all students under the age of 18 must obtain parental permission and must sign and return this form to the school office.

Access to e-mail and the Internet will enable student to explore thousands of libraries, databases, and bulletin boards while exchanging messages with Internet users throughout the world. Families should be warned that some material accessible via the Internet may contain items that are illegal, defamatory, inaccurate or potentially offensive to some people. While our intent is to make Internet access available to further educational goals and objectives, students may find ways to access other materials as well. We believe that the benefits to students from access to the Internet, in the form of information resources and opportunities for collaboration, exceed any disadvantage. But ultimately, parents and guardians of minors are responsible for setting and conveying the standards that their children should follow when using media and information sources. To that end, Carbon School supports and respects each family's right whether or not to apply for access.

SCHOOL INTERNET AND E-MAIL RULES

Students are responsible for good behavior on school computer networks just as they are in a classroom or a school hallway. Communications on the network are often public in nature. General school rules for behavior and communications apply.

The network is provided for students to conduct research and communicate with others. Access to network services is given to students who agree to act in a considerate and responsible manner. Parent permission is required. Access is a privilege - not a right. Access entails responsibility.

Individual users of the school computer network are responsible for their behavior and communications over the network. It is presumed that users will comply with school standards and will honour the agreements they have signed. Beyond the clarification of such standards, the school is not responsible for restricting, monitoring or controlling the communications of individuals utilizing the network.

Network storage areas (hard drives) may be treated like other school property. Network administrators may review files and communications to maintain system integrity and insure that users are using the system responsibly. Users should not expect that files stored on school hard drives will always be private.

Appendix J

Within reason, freedom of speech and access to information will be honoured. During school, teachers of younger students will guide them toward appropriate materials. Outside of school, families bear the same responsibility for such guidance as they exercise with information sources such as television, telephones, movies, radio and other potentially offensive media.

The following are not permitted:

- Sending or displaying offensive messages or pictures
- Using obscene language
- Harassing, insulting or attacking others
- Damaging computer, computer systems or computer networks
- Violating copyright laws
- Downloading or installing of any commercial or shareware programs
- Using another persons password
- Trespassing in another persons folders, work or files
- Intentionally wasting limited resources
- Employing the network for commercial purposes

Violations may result in a loss of access as well as other disciplinary or legal action.

User Agreement and Parent Permission Form - 1997

As a user of the Carbon School computer network, I hereby agree to comply with the above stated rules - communicating over the network in a reliable and responsible fashion while honouring all relevant laws and restrictions.

Student Signature: ______________________________

As the parent or legal guardian of the minor student signing above, I grant permission for my son or daughter to access networked computer services such as electronic mail and the Internet. I understand that individuals may be held liable for violations. I understand that some material on the Internet may be objectionable, but I accept responsibility for guidance of Internet use - setting and conveying standards for my daughter or son to follow when selecting, sharing or exploring information and media.

Parent Signature: ______________________________

Date: ______________________________

Name of student: ______________________________